"THE FAR EASTERN REVIEW" – CHINESE RAILWAY CONSTRUCTION

A COMPREHENSIVE STUDY OF HISTORICAL REFERENCES WITHIN THE LIFE OF THIS JOURNAL OF THE DEVELOPMENT & CONSTRUCTION OF CHINA'S EARLY RAILWAYS, INCLUDING EXTRACTS OF RELEVANT PAGES **(SECTION 10 of 14)**

For Introduction please see preface to Volumes I - V

(Note : to view the relative pages of the magazine, scroll down to end of these notes for each volume, respectively)

Volume XXV

January 1929

China's Railway Rehabilitation Two and half page report about Minister of Railways, Sun Fo's attempt to reinvigorate China's railways.
Rebuilding of the Yellow River Bridge Illustrated article describing the plans to repair the Tientsin-Pukow Railway's Yellow River bridge which had been seriously damaged by the Northern Army during the civil war.
Engineering Notes:-
To Build Liuyuanko-Kaifeng Light Railway plans were being made to build a light railway on the southern bank of the Yellow River near Kaifeng.
New Mukden-Fakumen Railway Plans were advancing for this new line.
Linan-Kochiu Railway, Yunnan Province The Linan-Pisehehai (碧色寨 *Bisezhai*) section had been completed.
New Extension of Taonan-Angangchi Line The work had been completed and traffic had started to Tsitsihar.

February 1929

Rehabilitation – China's First Political Problem Editorial about Sun Fo's difficulties in improving China's railways.
Beans Article describing the relationship between the soy bean growing and processing industry and Manchuria's railways. Photos of bean cake loading onto railway wagons.
New Fushun Shale Oil Plant Illustrated article about a new shale oil processing plant at the SMR's Fushun Colliery. Photos of railway tracks and wagons serving the plant as well as electrical excavators.
Electrical Undertakings in Manchuria I photo of the SMR's railway tracks and E.M.U rolling stock near Fushun Colliery No.1 Power House

South Manchuria Railway New Coal Port Illustrated description of a new mechanical loading pier near Dairen.
Japan's Iron & Steel Industry 2. Photos of an electric locomotive at the Manchurian Anshan steel Works & railway tracks serving the coke ovens.
Engineering Notes:-
New Railways in Manchuria Report that various new lines had been proposed.
Yellow River Bridge Repaired Report that the bridge repairs had been completed and through-traffic on the Tsinpu line could be restored.
Longest Bridge in Orient Completed The Yalu bridge on the Mukden-Antung railway was no longer the longest bridge in the Orient, this distinction having shifted to Japan's Yoshino River bridge.
Chinese Government Railways Advertisement for Shanghai-Nanking and Shanghai-Hangchow-Ningpo Lines

March 1929
S.M.R. Shakako Shops Illustrated description of the South Manchuria Railway's locomotive shops near Dairen. I sketch-plan of the shop's layout and photographs and descriptions of locomotives, wagons and carriages built at the works. (total of 12 photos)
Engineering Notes:-
Statistics About the Manchurian's Railways List of railways and lengths etc.
New Branch Line to Kirin-Hailungcheng Line The surveys for this line were almost complete.
Northwestern Railway Planned A plan for a light railway between Shansi and Urga was under consideration.
New Branch Line to Kirin-Hailungcheng Line The surveys for this line were almost complete. (repeat of item on page 141)

April 1929
The Construction Program of the Ministry of Railways Details listed of Sun Fo's railway proposed railway construction program.
The Potential Earning Power of Chinese Government Railways Financial figures for the railways 1915-1925 and forecast earnings for the years 1930-1945
How Yellow River Bridge of Tientsin-Pukow Railway was Lifted and Repaired for Traffic. Illustrated description of how repairs were carried out. 5 photos and one sketch plan.
Engineering Notes:-
Kwangtung-Yunnan Railway Engineers had started surveys for this proposed new line. Includes a list of towns and cities expected to be on the route.
Survey of New Railway Begun A report that surveys for the Kwangtung-Kiangsi & Kiangsi-Fukien Railways had started.

May 1929
Shanghai-Nanking Railway Details of proposed changes to the working and loan agreements for this railway following allegations of "indifference and even corruption" against foreigners operating the railway. The British General Manager and Chief Engineer, (A. C. Clear) had since resigned.
Heavy Trains and Long Runs on the Chinese Eastern Railways. A copy of a report by S. J Kolpachnikoff from Baldwin Locomotives magazine about the performance of locomotives on the CER. 1 sketch map of CER and 5 photos of locomotives.
10 Locomotives for China's Railways A description of ten 'Mikado' type locomotives ordered from Baldwin for the Tientsin-Pukow Line. 1 photo.

Work on the Canton-Hankow Railway H.S. Chuck , Managing Director of the unfinished portion of the railway had reported on an inspection trip.
The Harbin Main Shops of the Chinese Eastern Railway Illustrated description of the locomotive and rolling stock repair shops at Harbin. 5 photos.
Engineering Notes:-
To Make the S.M.R. a Private Corporation The president of the SMR had proposed privatizing the company.
New Name of the Peiping-Mukden Railway The railway was henceforth to be known as the Liaoning-Peiping railway according to government mandate.
Rolling Stock The Ministry of Railways had requested that armored cars and locomotives be converted for regular passenger use.
New Tsitsihar-Koshan Railway Reported that 29 kms of track has been laid.
15 Chinese Railways Planned The Ministry was planning to finish 15 short lines within the following six years.
New Kirin-Hailungcheng Line construction was progressing with 27.8 km of track laid.
New Chekiang Railways Three new inter-Provincial railways were planned from Hangchow.

June 1929
Some Railway Problems in China A summary of an address given to the Railway Society of China by a former Minister of Communications (1920-1924 period), Yeh Kungcho (葉恭綽) about how civil war had impacted the railways.
Engineering Notes:-
Hailung-Kirin Railway Completed The work had been completed and through traffic was due to open on 15th May.
Nanking's Railway Projects Reconnaissance parties were being sent to investigate routes for the proposed Yunnan-Changsha & Yunnan-Canton lines.

July 1929
The Chinese Eastern Railway Crisis Deputy Editor of the F.E. Review , George E. Sokolsky writes about the disagreements between the Russian Soviet government and China over control of the C.E.R.
Railway Economics for China British railway engineer and writer, H Stringer continues with his analysis of China's railway economic problems and suggests what the priorities should be.
Engineering Notes:-
Two Branch Lines in Mukden Completed The PMR had recently finished two short branch lines, one to Pei Lin North Imperial Tombs and the second to Tung Ling Eastern Imperial Tombs.
Construction of Light Railway between Khunchun (Chinese-Russian border region) and Tumen. The Kirin authorities had been requested to grant permission for this railway's construction.
New Tsitsihar-Koshan Line The Tsitsihar government was trying to raised funds from nearby prefectures.
Proposed Hangchow-Kiangshan Line A short line linking these had been proposed.
Reconnaissance Parties on the way to Yunnan Two survey parties were at work.
Hangchow-Nanchang, Hangchow-Foochow and Hangchow-Anking Lines Proposed The Province of Chekiang was intending to lay down three railways with Hangchow the central point.

New Tsitsihar-Koshan Line Earthworks and track-laying were proceeding.
Lunghai Railway Purchases List of expenditures approved from the Belgian Boxer Indemnity Fund.
Projected Kalgan-Dolonor Railway Construction on the long-projected railway between Kalgan and Dolonor would commence in six months
Conversion of Armored Train into Passenger Cars The Ministry of Railways had requested that armored cars and locomotives be converted for regular passenger use (repeat of news in May edition)
Inspection Trip Made H.S. Chuck, Managing Director of the unfinished portion of the railway had arrived in Nanking to report on his inspection trip for the unfinished Canton-Hankow line.

August 1929
The Boxer Indemnity and Railways. H Stringer writes a further analysis on how best to invest in Chinese railway development using Indemnity funds
South Manchuria Railway An extract from "Report on Progress in Manchuria 1907-1928" published by the SMR. Includes description of the railway and includes photos of rolling stock.
Engineering Notes:-
Chinese Railway Expenditures. The Ministry of Railways announced approval of £349, 625 from the Belgian Boxer Indemnity Fund for the purchase of cars, locomotives and other railway materials. List of items provided.
Construction of Taiyuan-Shihkiachwang Railway Extension to Tsangchow Under Consideration. Construction of this line was to start.

Work Ordered on New Section of Canton-Hankow Line. Mr. Sun Fo, Minister of Railways had issued to start preparations for the completion of the Shaokwan-Lochan section of the Canton-Hankow Railway
Agreement Between Minister of Rails and a British Firm Details of a loan agreement for materials to be supplied to the Shanghai-Nanking Railway.
Belgian Boxer Fund for Rolling Stock. Th Ministry of Railway had announced that $1,000,000, from the Belgian Boxer indemnity Fund would be used for the purchase of new rolling stock for the Tientsin-Pukow Railway lines.

September 1929
Engineering Notes:-
China's Railways. Report on a program for the construction of a network of railways through-out the country to be completed in four periods has been formulated by the National Highway Planning Committee under the Chairmanship of Minister of Railways Sun Fo.
Railway Purchases in China. A sum of $1,600,000 from the returned Belgian Boxer Indemnity Fund would be used for the purchase of rolling-stock for the various Government railways. The greater part to be for the Tsin-Pu Railway. (update on similar report in August edition)
New Kirin-Tung and Mishan-Muling Lines The Kirin Provincial Government, was postponing the proposed construction of these lines.

October 1929
Work of the Ministry of Railways in China A nine-page report of tabled statistics relating to the financial state and performance of China's railway system.
Engineering Notes:-

Lunghai Railway Preparations were under way for the completion of the last section of the Lunghai railway between Tungkwan and Sianfu (潼关 -西安) under a Belgian Chief engineer.
The Tunhua-Laotaokou Railway This new line in east Manchuria was intended to link up the Kirin-Tunhua Railway with the Tumen Light railway.

November 1929
The Kowloon-Canton Railway Short extract from the annual report of the railway indicating that 1928 had been a “successful year”.
Locomotives and Passenger Cars for the Kirin-Hailung Railway Illustrated report about ALCO locomotives and passenger cars being delivered in a fully erected state to the new Dairen Port for use on the Kirin-Hailung line. 5 photos.
Coal Mining in Manchuria Illustrated article about the Fushun colliery and shale oil plant. Several photos of a railway nature including a two-car EMU passenger train.
Engineering Notes:-
The Hu-Hai Railway Report that the Harbin-Hailun Railway had been completed by Chinese engineers.
Canton-Hankow Railway Report that construction of the uncompleted section of this line would be commenced shortly.

December 1929
Direct Purchasing of Materials by Chinese Railways The Nationalist Ministry of Railways was to establish a Purchasing Agency in London to cut down expenses by ordering direct from manufacturers and eliminate middlemen. Previously banks issuing loans had received a commission of 5% on all purchases made abroad.
Engineering Notes:-
The Kirin-Tungkiang Line Part of the survey for this proposed 500-mike line had been completed.
New Chinese Lines in Manchuria and Inner Mongolia The rails for the Tsitsihar-Koshan line had already been laid and traffic was expected to open in January. Surveys for other branch lines were in hand.
Lunghai and Canton-Hankow Lines Short report with update of the progress on these lines.
Line to Connect Changchun and Kwanchengtzu Stations The railway to be built connecting Kwanchengtzu station on the CER with Changchun on the Kirin-Changchun Line would be Russian gauge.

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BINDING

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路拾六號

遠東時報

MR. T. V. SOONG'S BUDGET PLAN

THE CONSORTIUM'S ATTITUDE TOWARDS CHINA

CHINA'S RAILWAY REHABILITATION

SINO-JAPANESE AMITY

THE REHABILITATION OF THE YELLOW RIVER BRIDGE

Vol. XXV January, 1929 No. 1

SHANGHAI, PEKING, TOKYO AND MANILA

China's Railway Rehabilitation

Mr. Sun Fo's Efforts to Create a Modern Railway Service; Policies Authoritatively Described

New Rolling Stock for the Shanghai-Nanking Railway

UNDER the ministry of Mr. Sun Fo, China's railways are rapidly being placed upon a sound footing. The problem seemed to afford no solution a few months ago; the militarists held all the lines; the revenues were being squandered; rolling stock was lacking and the little that remained was horribly out of condition. Yet, Mr. Sun and his associates have faced the problem with courage and energy and are restoring the roads with a businesslike capacity for hard work and concentration on the main task, unusual in Government circles.

There are many who would have China start on numerous new projects immediately. But the Ministry of Railways has apparently adopted a program of rehabilitation first. Get the existing lines in working condition before anything is done to start new lines! This attitude and the workmanlike procedure of Mr. Sun Fo and his associates has created a confidence, far beyond anything felt in the general situation. This confidence has already expressed itself in the exceptional financial transaction in the course of which a Shanghai firm of brokers took Gold $2,000,000 of Belgian Boxer Indemnity Six Per Cent Gold Bonds at 84 from the Ministry and its fiscal agent in the transaction, the Belgian Bank. The total amount of this issue made available for purchase was Gold $4,000,000,000 and it was all taken up within 48 hours, and all of it is to be used for the purpose of rehabilitating the railways.

The increased earnings of the Shanghai-Nanking Railway which is directly managed by the Ministry of Railways, through its Director of the Bureau of Administration, Mr. Choy Ju-kee, afford as astonishing evidence of the value of Chinese railways, if the management is efficient and honest and when there is no interference by the militarists.

The Policy of the Ministry of Railways

The creation of a separate ministry to administer the Chinese Government railways early this fall was a distinct manifestation of the will of the country to reconstruct herself during this political tutelage period. The programme before the Ministry of Railways can be resolved into two principal parts: first, the rehabilitation of the existing railways through the retrenchment of the working forces and adjustments in securing efficiency of management and independence of finance; and, second, the construction of new lines up to the mileage as pronounced by the late Sun Yat Sen.

One striking instance of attempts at rehabilitation is the direct operation of the Shanghai-Nanking and Shanghai-Hangchow-Ningpo Railways by the Administration Department of the Ministry. No small amount of savings was effected through the reduction of the personnel, about thirty useless positions having been abolished. Likewise, more publicity has been given to the purchase of stores. Through well organized bidding, the lines are now purchasing coal, for instance, at a little over $13 a ton, as compared with the exorbitant price of $16.50 hitherto paid, thus saving the cost of about 350 tons per day.

Further improvements in the two lines, by way of facilitating traffic, found expression in the resolutions passed pertaining to the apportionment of a part of the private cars for the use of ordinary passengers and the reservation of berths by government officials. Of the twelve cars formerly commandeered, all but one have been returned.

The replenishment of rolling stock is being carried on in other railways as well. Only recently the Ministry arranged a Mex. $1,000,000 credit with the Belgian Bank for the purchase of two passenger trains costing $800,000 and forty 40-ton goods wagons at a cost of $200,000 for the Tientsin-Pukow Railway.

The other principle enunciated by the Ministry is that railway funds shall be kept separate and distinct, and should be divorced from political or military appropriations detrimental to the financial policy of the different railways. A study of all the existing Loan Agreements is under way. The Ministry will undertake to recognize and to meet the old obligations, as circumstances warrant.

For the completion of existing railways and the construction of new lines, a Bureau of Engineering has been formed, which has for its task the surveying, planning, and construction of intended projects.

At the first Meeting of the Advisory Committee on Fares, Rates and Classification of goods, Mr. J. K. Choy, Director of the Administrative Bureau presided. The following is a summary of the discussion.

It was explained that up to the present transportation on the railways had been governed by the regulations issued on the authority of the late Minister of Communications, and these had taken the place of transportation law. Now that China was working out a code of law based on western models, it was necessary that provisions regarding the duties of transport undertakings such as railways, should be included.

Transportation law has two phases; the first, the rights and duties of the railways as members of the community. Second, their rights and duties in performing transportation under transportation contracts.

On the suggestions of the Chairman, the meeting first considered whether it was time for the drafting of such a law, and how far the railways would be able to live up to its provisions if it were drafted. It was the opinion of the meeting that the time had come when the railways should abandon the autocratic attitude they had adopted in the past and face their responsibility to the community. They should, therefore, be prepared to adopt what is known in British law "Bailee's responsibility," by which they would be responsible for any consequences which arose from wilful misconduct and gross negligence on their part in carrying out the transportation of passengers and goods. This would be their responsibility as part of the community *vis-a-vis* other members of the community. This should be the principle of any transportation law to be embodied in the code of laws of the country.

The next point in connection with transportation law was the position of the railways as regards the transportation contract. The various kinds of risks incidental to transportation were considered, and it was agreed that, subject to the provisions of the general law of the country, as suggested above, risks arising from *force majeure*, the nature of the goods transported, the action of outside authorities, or the action of the owner of the goods should not be placed at the responsibility of the railways in the transportation contract. In the case of ordinary risks arising from transport, such as accident to trains, fire and the like, which are misfortunes both to the railways and the owners of the goods, it was considered that the proper course was to have such risks covered by insurance. It was also decided that in making the draft of transportation law, the general principles only should be laid down at present, leaving to the experience of the future the elaboration of the law, so that it would mould itself to the requirements of the country. In regard to the question of insurance, it was noted that in the present state of the railways it would be found difficult to introduce that generally, but that its introduction would have to be gradual,—first on the railways which would be able to live up to the responsibilities, and then extending it later to other railways as they were brought into a condition to undertake it. The responsibility under the general law of the country should however be adopted by all railways at once. A committee was then appointed to make a draft of the law required.

Passenger Fares

The meeting then took up the discussion of passenger fares, and the possibility of having a basic rate the same for all railways was considered. In the course of the discussion it was brought out that in certain districts where there was competition between

the railways and other means of transportation, the railways had to adopt a low basic rate for their fares, while in other districts where competition was absent the railways could apply higher basic rates fixed to accord with the conditions obtaining in their territories. The meeting finally decided to record its opinion that, while a basic rate the same for all railways was desirable, it was impossible of attainment because of the competitive reasons referred to, and also because of the diverse conditions obtaining in different parts of such a vast country as China. Each railway should therefore be allowed, subject to the approval of the Ministry of Railways, to fix the basic rates for its passenger fares and the Ministry, in examining the basic rates as proposed by each railway, should follow the policy of unifying these in the case of two or more railways when this can possibly be done, thus attaining a certain amount of regional unification.

In regard to the proportion to be observed between the first, second and third class fares it was reported that the proportion between the fares for the different classes now in use was, generally speaking, two times the third class for the second class, and three times the third class for the first class. However some railways could not observe these proportions exactly, because for competitive reasons their third class fares were fixed on a low basis, for example, the Shanghai-Nanking Railway. In the case of that line its first class fare had to be made four times the third class fare otherwise it would be too low, and even with that it was still somewhat below the level of other railways.

It was agreed that as far as possible the proportion of one, two and three between the first, second and third class fares should be observed, but that the Ministry could authorize exceptions where it was found necessary.

In regard to the question whether the fare tables should be tapering ones or at a flat rate for the whole distance, it was pointed out that in the case of goods traffic the railways gave a reduction based on distance. The reasons for this were that in the case of goods it was to the advantage of the railways to have long hauls as they could get better use of the rolling stock. In the case of passengers, the railways had to provide the trains anyway, and so long as they could fill them, there was no reason for them to encourage long distance travel by giving a reduction, besides passengers who travel long distances could generally afford the full fares.

With reference to the Passenger Traffic Regulations it was pointed out that the form of the transportation law would exercise an effect on the way in which these regulations would be drawn up and until that was decided, consideration of the matter should be deferred. The question of the parcels rates was brought up, and as the regulations contended for other matters relating to rates it was considered best to have them examined by a small committee.

Goods Rates

The question of the goods rates were then taken up. As regard the matter of having basic rates the same for all railways, it was found that the same considerations as applied to passenger fares applied to the goods rates. The meeting therefore, resolved that its recommendation on passenger fares should apply to goods rates as well.

The question whether the present system of carload, ton and fifty kilogramme rates should be maintained or whether a system of two rates, one for carload and the other for less than carload should be adopted was then discussed. It was pointed out that when the Chinese railways revised their rate system and adopted the metric system some years ago, it was then decided that in addition to the carload rate, two additional rates, one for goods in ton loads and another for goods in small quantities should be arranged. The reason for this was that goods conveyed in less than carload entailed a certain loss in car space, and more handling than if the goods were sent in full carloads. Consequently the railways should be paid for the conveyance at a higher rate to compensate them for this. Unfortunately the railways had been allowed to fix their rates in such a manner that the proportion between the carload rate and the two other rates were too great, in some cases as high as 100 per cent. It had been found that this had greatly contributed to the development of transportation companies, as these companies could take goods from merchants in small quantities, and charge the merchants the rates of the railway for less than carload, and hold the goods until they had collected a full carload, and then ship them over the railways at the carload rate, thus making a handsome profit. While it was recognized that it was to the advantage of the railways to have goods sent in carloads, it was not to the advantage of either the railway or the public that transportation companies should be allowed to make such large profits. The railway should therefore, examine the whole question and fix their rates for less than carload quantities at a percentage higher than their carload rates, sufficient only to compensate them for the loss of car space and extra labor in handling the goods. The exact proportion between the two rates would have to be carefully worked out. The meeting approved that there should be only two rates, and referred the question of proportion between them to be examined by the small committee appointed to deal with the Passenger Traffic Regulations.

The question of the calculation of the tapering rates was then taken up, and the various methods in use on the railways in applying the taper were explained. It was agreed that the small committee above referred to should deal with the question, and work out a uniform method.

The question of the principles to be observed in the making of special rates was also referred to the small committee. In regard to the unification of the handling and other terminal charges, a considerable discussion took place in which reference was made, to the different rates and conditions of labor at different places, and the difficulty of dealing with laborers who in certain cases insisted in collecting the whole of the handling charges themselves. It was agreed that a uniform rate for handling charges, also to include other terminal expenses, such as storage, police supervision and the like, and to be known as " charges for extra services rendered by the railways " should be worked out, and the small committee was entrusted to attend to this, and to report to a later meeting.

The Goods Traffic Regulations were also left to be reviewed by the small committee.

With regard to the questions relating to the classification of goods, a draft commodity group index was presented to the meeting. It was explained that this index had been drawn up to follow in general the Chinese system of indexing which was by the nature of the products. It was proposed to make this system a standard one for the publication of the classifications in various languages. In addition it was intended, if thes ystem of group commodity indexing were adopted for the classification, to arrange for the commodity statistics to be kept by groups corresponding to the index, so that information would always be available in dealing with questions of rates in an intelligent manner. The meeting approved the principle, and it was left to Mr. Lockhart to complete the work, and submit it to a later meeting of the committee. The committee also agreed to recommend that the classifications drawn up on the lines suggested should be published in Chinese, English and French.

The small committee, referred to above, was entrusted with the duty of working out the method to be employed in investigation in commodities for purposes of classification, and also with the working out of the exact definitions to be used in the sub-classification of various articles.

The Financial Condition of the Shanghai-Nanking Railway

The year 1929 bids fair to be one of the most prosperous years in the history of the Shanghai-Nanking Railway so far as its financial possibilities are concerned.

According to latest reports from the Railway, the approximate cash balance at the end of this June, calculated on the basis of the preceding year, is in the neighborhood of $1,098,000 and at the end of this year $3,069,000, assuming that the earnings for the first period average $28,000 a day and for the latter period $30,000, and that the saving on coal through reduction in price is about $300,000 for the whole year.

Out of the total cash balance of $3,069,000, $1,000,000 is due for capital expenditure covering the last four years, in accordance with the 1924 Agreement which provided $250,000 a year for such purpose. An amount of $1,247,000 should also be set aside for meeting amortization charges. After deducting another sum of $520,000 (taken from last year's total), as allowance for unpaid military traffic, and making provision for capital funds and amortization charges above-mentioned, there should remain a net cash balance of about $300,000.

The Railway has the potentiality of making handsome earnings, as a result of the recovery of peaceful conditions throughout the regions through which it traverses, and the choice of Nanking as the National Capital. From the earnings alone, new additional rolling stock may be purchased to meet the increasing volume of traffic, both passenger and goods—the expanding traffic with the new capital and the heavy goods traffic of the Tientsin-Pukow Railway when it begins operations.

Half of the amount of capital funds—$500,000—may be utilized for uncompleted work, urgent capital works, and the Sentinel coaches already purchased. The other half may be devoted to the acquisition of passenger engines, coach underframes, goods engines and wagons, costing in all a total of $1,500,000, the balance short to be made up from earnings of the additional stock in two years.

In short, the financial prospects of the Shanghai-Nanking Railway are excellent and the figures given conservative and reasonable. The proposals for the acquisition of additional rolling stock which allow of much needed expansion are decidedly favorable to bondholders.

Contract Placed for Five "Sentinel" Coaches

To relieve the existing rolling stock for main line traffic, the S.N.R. has recently ordered through Messrs. Scott, Harding & Company of Shanghai five gear-driven double articulated rail cars of the "Sentinel-Cammell" type, the joint product of the Sentinel Waggon Works, Ltd. and Cammell, Laird & Co., Ltd.

The allocation of the £150,000 capital expenditure is to be employed to purchase through the British and Chinese Corporation the following additional rolling stock: 3 passenger locomotives, £27,000: 24 Coach Underframes, £19,200; Body-building at the Woosung Works, £26,000; Electric Light Equipment, £5,500: 6 Goods Engines, £54,000: 35 Steel Covered 40-ton Goods Wagons, £17,600.

The purchase of the five "Sentinel" Coaches will release two engines and one local train for Main line service.

Estimated Cost of New Rolling Stocks and Materials for Repairs on Chinese Government Railways

(Compiled by the Ministry of Railways, Nanking)

ESTIMATED COST OF ROLLING STOCKS

NAME OF RAILWAYS	New Locomotives			New Coaches			New Wagons		
	No. Required	Unit Cost	Total Cost	No. Required	Unit Cost	Total Cost	No. Required	Unit Cost	Total Cost
Canton-Hankow Railway, Canton Section	4	$90,000	$360,000	20	$40,000	$800,000	50	$ 7,000	$350,000
Canton-Hankow Railway, Hankow Section	6	90,000	540,000	6	20,000	120,000	200	7,000	1,400,000
Canton-Kowloon Railway	3	90,000	270,000	10	40,000	400,000	—	—	—
Canton-Samsui Railway	3	90,000	270,000	20	40,000	800,000	—	—	—
Hankow-Peiping Railway	30	90,000	2,700,000	30	40,000	1,200,000	300	7,000	2,100,000
Tientsin-Pukow Railway	20	90,000	1,800,000	30	40,000	1,200,000	300	7,000	2,100,000
Peiping-Suiyuan Railway	25	90,000	2,250,000	40	30,000	1,200,000	300	7,000	2,100,000
TOTAL			$8,190,000			$5,720,000			$8,050,000

ESTIMATED COST OF MATERIALS FOR REPAIRS

NAME OF RAILWAYS	Old Locomotives			Old Coaches			Old Wagons		
	No. Required	Unit Cost	Total Cost	No. Required	Unit Cost	Total Cost	No. Required	Unit Cost	Total Cost
Canton-Hankow Railway, Canton Section	10	$ 8,000	$ 80,000	80	$ 1,000	$ 80,000	200	$800	$160,000
Canton-Hankow Railway, Hankow Section	18	10,000	180,000	8	2,000	16,000	78	500	39,000
Canton-Kowloon Railway	5	10,000	50,000	30	1,000	30,000	—	—	—
Canton-Samsui Railway	5	10,000	50,000	100	1,000	100,000	—	—	—
Hankow-Peiping Railway	43	10,000	430,000	58	3,000	174,000	340	500	170,000
Tientsin-Pukow Railway	60	10,000	600,000	40	4,000	160,000	300	500	150,000
Peiping-Suiyuan Railway	58	10,000	580,000	10	1,500	15,000	90	500	45,000
TOTAL			$1,970,000			$575,000			$564,000

Grand Total: $25,069,000

The Consortium's Attitude Towards China

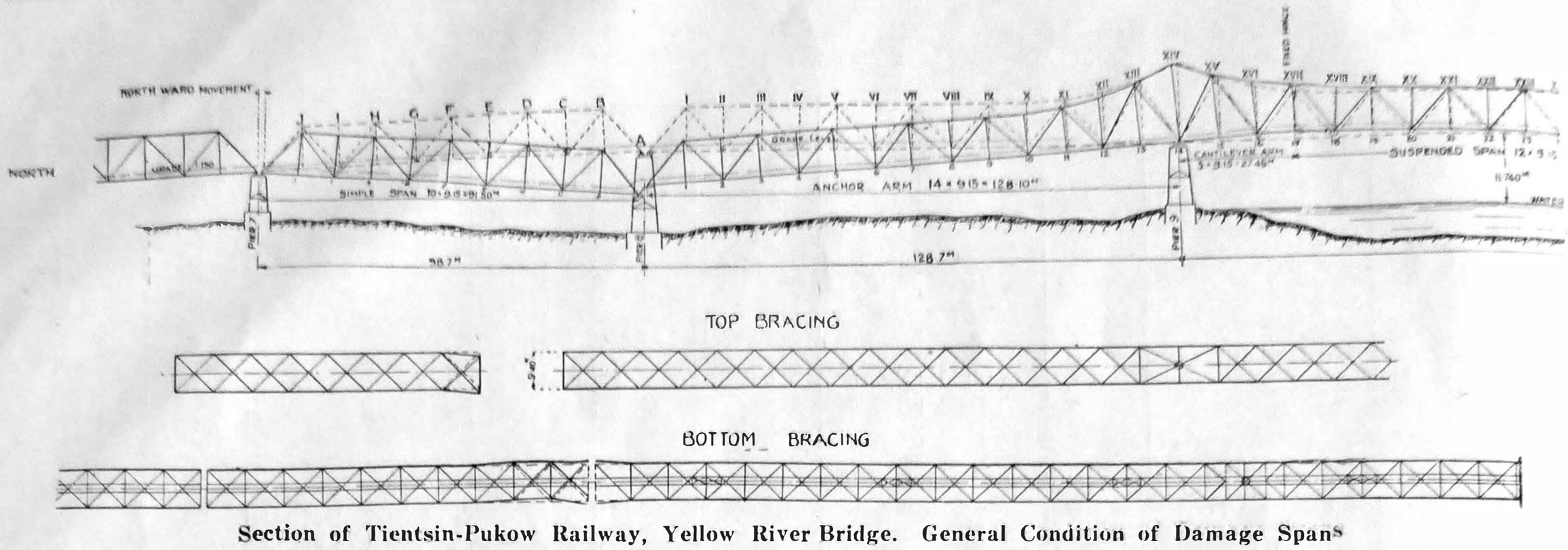
MR. Thomas Lamont in his address before the China Society in New York, commented on the attitude of the Consortium toward China, in a manner so clear and definite that his meaning could not at all be misunderstood. He said:—

"Your Chairman in his introduction alluded to my interest in the International Consortium for the assistance of China. In this connection may I point out once more that the aims and purposes of the Consortium have apparently never been clearly understood in China? The Consortium was organized in 1920, not for the purpose of securing a monopoly of Chinese Government finance, but of co-operating in extending the financial aid which the Chinese Government and/or Chinese Provinces might seek in the construction of railways or in other sound economic developments. At that time, you will recall, the Chinese Government was none too stable, and the bankers of no single one of the so-called Western nations were prepared alone to undertake the responsibility of loans to China. Therefore, they were grouped together in much the same way as was the old Six-Power Group which made the so-called Re-organization Loan to China; and it was hoped that by this grouping more effective service could be rendered for Chinese affairs.

For the last eight years, however, or since the organization of the Consortium it has obviously been impossible for any existing Government in China to command credit from the Consortium or from any other group of bankers. The situation now is that the Consortium stands ready, as it has heretofore, to listen to any proposals which the Chinese Government may make for the co-operation in the building up of great public utilities in China. This by no means implies a promise to lend money to China at the present time. Necessarily a considerable period must elapse before the present authorities show by their prudent course that China is entitled to credit from world investors. If and when this period is completed and the fact is made clear then, as I say, the Consortium will, if requested by China to do so, be prepared to lend its co-operation in whatever way may be feasible."

The fact is that all Powers are extending to China the hand of friendship. The Consortium represents the financial strength of the principal Powers and it must be taken into account in any calculations of the practical expressions of friendship. China is too often guided in these matters by ancient suspicions as to the purposes and motives, which inevitably lends to a wasteful wrangle

(Continued on page 11).



Section of Tientsin-Pukow Railway, Yellow River Bridge. General Condition of Damage Spans

Rebuilding of The Yellow River Bridge

By Alfred Batson

THE Yellow River Bridge at Luckow on the Tientsin-Pukou Railway a short five miles above the important trade center of Tsinan is the longest cantilever bridge in the Far East and one of the longest in the world. It is a steel structure consisting of a cantilever bridge 422.1 m in total length with eight approach spans of 91.5 m simple trusses at the North end and one at the South end. The total distance between the abutments is 1255.2 m.

The arrangement of spans of the cantilever structure with the provision for expansion may be represented by the following diagram:

North anchor span 128.1M	N can arm 27.45	Suspended span 109.8M	S can arm 27.45	South anchor span 128.1M

Channel span 164.7M

The cantilever structure is level but the approach spans are on a grade of 1:150. The rail level is about eight meters above the high water mark and 12 meters above the normal water level.

The width of the bridge is 9.4 m between the centers of trusses which is enough for a double track, but only a single track is now provided midway between the trusses. Another can be added whenever traffic warrants.

The bridge was fabricated and erected by Maschinenfabrik Augsburg, Nurnberg A. G. Germany. The work was started in August 1909 and completed in October 1912. The cost including superstructure was 12 million marks (about six million Chinese dollars).

The following figures on the various ratios will be of interest:

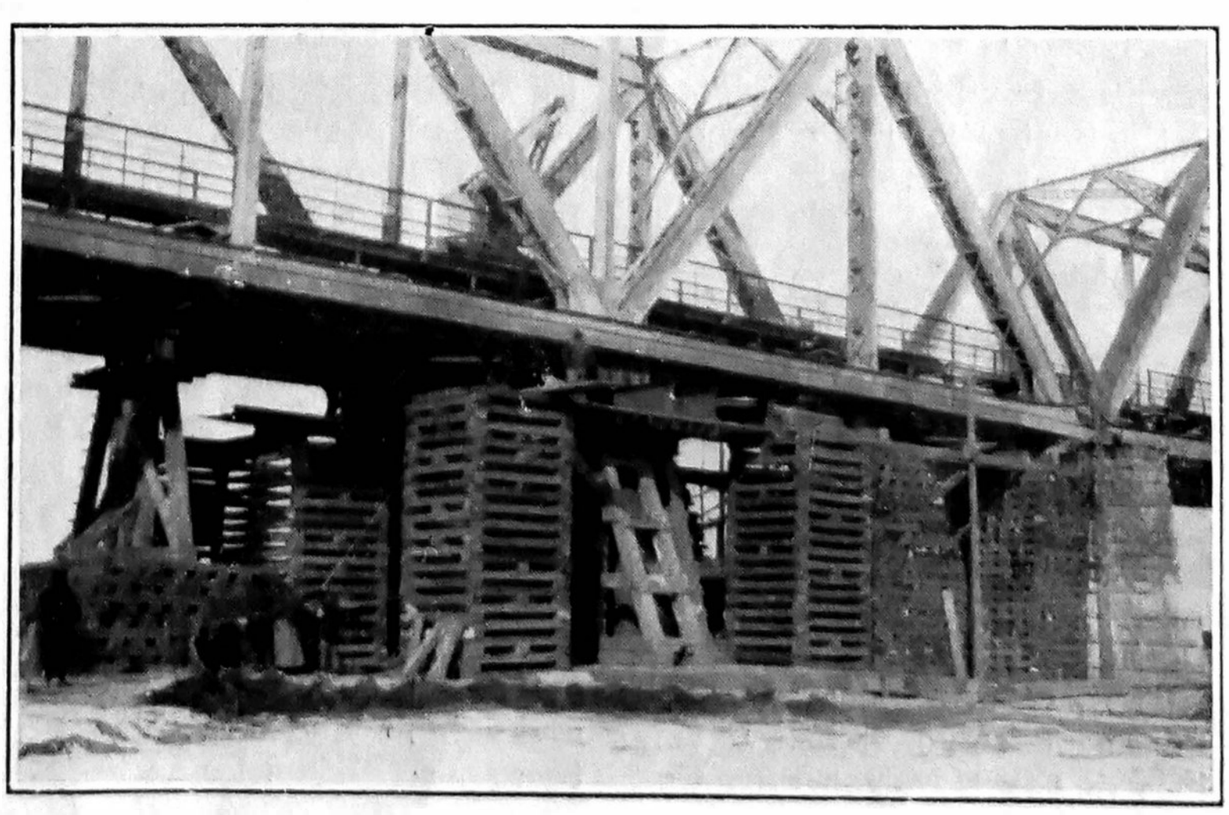
Channel span 540
Anchor span 420

Ratio of anchor arm to channel span .778

Ratio of suspended span to channel span .667

Ratio of cantilever span to anchor arm .214

When the Northern Army in the recent Chinese civil war retreated to their strongholds in the interior it was only natural that such an important avenue of pursuit by the Nationalist forces should be removed and bombs were blown under one of the piers holding an anchor arm of the cantilever. The damage can be seen in the accompanying photographs and the slightly enlarged blueprint drawing printed herewith gives a still better idea of what damage the bridge suffered.



Jacking Up the Damaged Section of the Bridge

Following the complete capitulation of the armies of Chang Tao-lin the Nationalist government made rapid strides toward the immediate repair of the Yellow River bridge but were hampered in their work by the much discussed "Tsinan Incident" of May last which brought the Japanese forces to a military control over the area and further repairing of the structure was prohibited by the Japanese officials.

Nevertheless the Chinese government had already sent competent engineers to the scene and from the report made by them and transmitted to the Government, the following details of the necessary equipment with estimated costs was taken.

Structural Units to be Renewed

Bottom Chord of East and West Trusses:—At the North end of the North anchor arm the outer leaves of the bottom chords of both trusses are disconnected from the gussets and bent outward to clear off pier top. These two chords should be taken off at nearest spliced point and new sections put in place.

End Floor Beam:—This member received the heaviest damage from the explosion. When it was suddenly dropped down on the pier top after the bridge shoes were blown away the web plate buckled in several places with the flange angles totally distorted. This member will have to be replaced anew.

Bridge Shoe:—The entire shoe under each of the two trusses was blown off the pier into pieces and needs to be replaced. This includes two sets of castings and rollers.

Gussets and Details:—The gusset connections at the panel points 0 were damaged to such an extent that new plates and diaphragms must be put in for connections with the new bottom chord and floor beam.

Other Members and Details:—In addition to the above the following members and details were also damaged. Two stringer brackets at panel point 0, the bottom bracing

The Break on the Bridge

and lateral plates in the North end panel, one set of new details for the top bracing at panel point XVII, two trolley I beams for the end panel with bracket plates.

Structural Parts to be Repaired

END POSTS OF EAST AND WEST TRUSSES:—The end post of the West truss at panel 0 remains apparently in good condition, but in the East truss the lower part of the bottom flange has its outstanding leg curled up to a slight curvature with the minimum deflection of 70 mm in a distance of 500 mm. The flange angle should be straightened out and the leg angle replaced if necessary.

STRINGERS AND CONNECTIONS:—The stringers in the end panel of the anchor arm seem to be in perfect condition but the connecting angles to the end floor beam should be closely examined after the latter is taken down. The top gusset plate on the West stringer at the end floor beam connection should also be replaced together with the bracing angle connected thereto.

As the only work going on at present is of a temporary nature due to alleged interference by the Japanese military and as the tenders for the permanent replacement steel have not yet been placed but must obviously follow shortly, the following engineer's account of the "Structural Steel to be Ordered" is of especial interest:—

For the cantilever spans:

1 end floor beam at panel point 0
2 end stringer brackets
2 cast steel expansion bearings complete
4 gusset plates at panel point 0 with two pedestals.
2 lower chords from end gusset plate to first splice
2 trolley I beams from end to first splice point with necessary connecting brackets.
2 lower horizontal bracings in the end panel with two bottom gusset plates.
1 set of new details for top bracing system at panel point XVII

For the damaged simple span:—

1 end floor beam at panel point "a"
1 intermediate floor beam at panel point "b"
2 end stringer brackets
2 fixed bearings complete
4 gusset plates at palen point "a" with two pedestals
2 lower chords from end to first splice point
2 stringers
2 lower horizontal bracings in the first panel
2 " " " " " second "
1 " " " " " third "
2 bottom bracing gussets at panel point "a" (east truss)
1 " " " " " " "b"

OTHER SPANS

1 portal strut for South end of span No. 2
1 knee brace for North end bridge entrance portal Field Rivets and Turned Bolts.

Order necessary number of field rivets for the above members. For the undamaged joints of the North anchor arm and simple span, order 20 per cent. of the total number of rivets in these joints.

Estimates

(*a*) LIFTING

Item 1.—Timber bents—			
Timber for trestle bents, 20,000 b m @ $110	$2,200		
Timber for base bents, 20,000 b m @ $110	2,200		
Iron fittings, etc.	200		
Carpenter	100	$4,700	
" 2.—Preparation of foundation—			
Loosening, excavating and ramping 100 m³ @ $2	200		
Sand, gravel 100 m³ @ $2.50	250	450	
" 3.—Jacking equipment and accessories—			
Ten 100 t screw jacks @ $700 each	7,000		
Four 50 t screw jacks @ $500 each	2,000		
I beams, slabs, etc., 20 t @ $150	3,000	12,000	
" 4.—Jacking labor—			
2,000 workmen days @ $2	4,000	4,000	
" 5.—Necessary scaffolding	2,000	2,000	
" 6.—Overhead 20 per cent.	4,650	4,650	
Total			$27,800

(*b*) PROVISION FOR TRAFFIC

Item 1.—Timber bents 30,000 ft. b m @ $110	$3,300		
Iron fittings	500		
Carpenter labor	400	$4,200	
" 2.—Sleeper stack —			
5,000 pieces sleeper @ $3	15,000		
Iron fittings, $300, labor $200	500	15,500	
" 3.—Preparation for foundation—			
Loosening, excavating and ramping 300 m³ @ $2.00	600		
Sand and gravel 300 m³ @ $2.50	750	1,350	
" 4.—Structural Steel			
I beams 24 tons, Details 6 tons } 30 tons @ $200	6,000	6,000	
" 5.—Erection labor 30 tons @ $30	900	900	
" 6.—Overhead 10 per cent.	2,850	2,850	
Total			$30,800

(*c*) REPAIRING

Item 1.—Clearing off Pier top—			
85 m³ for clearing and chiseling @ $5	$425		
" 2.—Remodeling of pier top—			
2 bed stones @ $20 each	400		
85 m³ of masonry @ 30 per m³	2,500	$2,950	
" 3.—Dismantling of Steel Work—			
70 tons of steel @ $25	1,750	1,750	
" 4.—Fabricated steel—			
70 tons of steel @ $500	35,000		
10 tons of steel casting @ $600	6,000	41,000	
" 5.—Rental for erection plant and tools	10,000	10,000	
" 6.—Erection and repairing 70 tons steel @ $70	7,000	7,000	
" 7.—Yoke and wire rope provision at joint XVII	1,500	1,500	
" 8.—Repairing of side walks	2,000	2,000	
" 9.—Repairing of inspection trolley	3,000	3,000	
" 10.—Painting	500	500	
" 11.—Readjustment of riveted joints	10,000	10,000	
" 12.—Contingencies 10 per cent.	8,075	8,075	
Total			$88,200

SUMMATION

(*a*) Lifting	$27,800	
(*b*) Provision for Traffic	30,800	
(*c*) Repairing	88,200	
(*d*) Supervision	5,000	
Total	$151,800	
LESS SALVAGE VALUE		
(*e*) Lumber	3,800	
(*f*) Sleeper	10,000	
(*g*) Steel	1,000	
(*h*) Tools and equipment	7,000	
	$21,800	
Total	$130,000	

The hope of the engineers in charge is that permission can be received from the Japanese to complete the work permanently in time for the September floods and in view of the situation now prevailing anent the Yellow River Bridge and the held locomotives and cars at the workshops the steel tenders may be made public sooner than expected.

At the same time the Japanese military are holding at the Tsinanfu yard of the Tientsin-Pukou Railway some 47 locomotives and 488 odd mixed goods and passenger cars belonging to this line and certain others, that were used by the various armies operating in this area until unfit for further use when they were run in the yards and deserted.

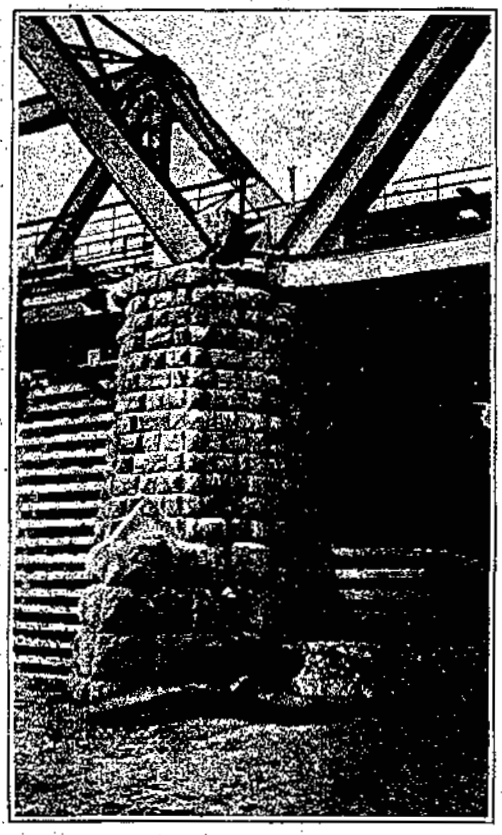
There the rolling stock remained until the situation of May third (the Tsinan Incident) when the Japanese established a military zone around the territory and have refused the line permission to repair the stock at its own yards in Tsinanfu, or take it to the headquarter shops at Pukou.

For the locomotives it can be said that they are a mixed conglomoration of various types and sizes. Many are of the well-known Mikado first class type and badly needed by the line to power goods along its tracks, others are small shunting engines that are likewise needed in the usual course of yarding and for short hauls.

This reporter was one of the party of railroad officials who approached the Japanese on the possibility of releasing the stock and on investigation of the stock standing for the past several months (since May) in the open yards the findings beggar description.

Not a waste box could be found that was even damp with oil. Axles in the general run of the locomotives were in almost every case rusted to such an extent that when repairing does start it will be several months before any considerable amount of the stock will be fit for general use. Boilers in many cases were left half filled and the rusted water has accomplished the usual results. Many have not been blown out since the regular trainmen were replaced at the throttles by the embryonic coolie-soldiers.

In several instances birds were found nesting in the cabooses and in short the scene presented many aspects of a humorous touch that were beyond the most vivid imaginations of fictionists.



How the Bridge is Jacked Up

As for the cars, they are the leavings of that odd and unusual caravan known as a Chinese army. Lavatories in many cases gave way to the indisposition to trouble oneself to walk to the end of the cars. Fires had been lighted in the centers of several first class coach floors and rifle marks and sabre cuts were everywhere. Benches in the second class compartments were offtimes torn down to provide fuel for the fire that had left its mark on the floor a few feet away, hardly a window in the whole lot was left intact, wiring was usually pulled out out of pure maliciousness and the famed "Blue Express" once the crack train of this line and the Far East was represented by several coaches whose deep and luxurious interior was the especial butt of the coolies' playfullness.

In one instance a fire had evidently been carefully kindled in an arm chair and when one burned itself through to the floor another was started in the adjacent resting place. The rich woodwork was the target of bayonet and sabre thrusts without number and the sleeping coaches were obviously used for more intimate purposes.

The only equipment which seemed not to suffer was the steel coal cars in which was moved the cavalry and it can be thought that this was due to the occupants being horses and not soldiers.

However with the consent of the Japanese the railway officials hope to start work on repairing as much as possible what equipment shows promise of being salvaged.

The method followed in raising the bridge to its former height is by the building of wooden sleeper structures underneath atop of which are placed batteries of Joyce jacks. As the jacks maximum extension is reached, the space gained is secured, additional timbering is placed underneath, and the operation repeated.

Japan's Iron and Steel Industry, 1

(Continued from page 21)

Philippine Islands, and these mines are not in operation, but during the past year the feasibility of working these mines for the sale of ores to Japan has been considered.

During the present year an Australian iron-mine owner has endeavored to negotiate for the development of a mine on an island off the coast of Australia and for the sale of ores to Japan. These ores are said to have a 69 per cent. iron content.

Ore-Supply Program

One of the most pressing problems of the Japanese iron industry is the formulation of a definite policy relative to ore supplies. The Ministry of Commerce and Industry is giving consideration to the matter on the basis of a report by the president of the Government Steel Works. It is planned to purchase 2,600,000 tons of ore during the coming two years. The falling off of imports in 1926 depleted reserves, which are now low, probably about 300,000 tons being on hand.

The problem consists primarily in assuring a continuous and ample supply for the Yawata Steel Works, which consumes the greater part of the ores imported from China and practically all of those imported from Chosen and Malaya.

The Yawata Works states that its requirements for the coming fiscal year amount to 1,350,000 tons. The sources of ores for the fiscal year 1927-28, as well as for the following fiscal year, are shown below:

Sources of Iron Ore for the Yawata Steel Works

[In thousands of tons]

Sources	Fiscal year 1927	Fiscal year 1928
Tayeh mines, Hupeh Province, China	355	400
Taochung mines, Anhwei Province, China	175	300
Johore, Straits Settlements	470	350
Chosen	222	200
Other	48	50

Ore is delivered to the Yawata Steel Works from China by the Nippon Yusen Kaisha and Mitsubishi Bussan Kaisha, in steamers carrying general cargo in addition to ores. The Yawata Steel Works also owns four special vessels for transporting these ores. The Nanyo Koshi, which operates the mines in Malaya, owns special ore-carrying steamers carrying ore supplies to the Yawata Steel Works.

Most of the ores are sold directly without the intervention of trading companies, by virtue of long-time sales agreements between mining companies and the iron-producing companies. Ores from some of the smaller mines are handled in part by Japanese importing firms, the most prominent of which is Jempei Ishihara & Co., of Osaka.

There is a fairly continuous flow of ores to the furnaces throughout the year, although the Malayan shipments cease during the winter rainy season, and the Yangtze Valley shipments are suspended from December to February.

ARSENAL CONVERTED INTO IRON WORKS.—The Reconstruction Department of Kiangsi has transformed the Kiangsi Arsenal into an iron works.

OJI PAPER MANUFACTURING CO. PLANS IMPROVEMENTS OF MILLS.—This company has large extension plans and improvement plans, the most important of these being the installation of one big set of paper making machines at its Tomakomai Mill, in the Hokkaido. It is reported that some boilers in this mill require urgent replacement, being installed as early as 1910. The efficiency of old boilers in this mill is gradually deteriorating and they have to be replaced before a few years to come. The company is also planning extensions and improvements at its Kokura Mill, in Kyushu, where an electric generator of 2,500 k.w. is to be installed.

STORAGE BONDED WAREHOUSE PLAN FOR YOKOHAMA.—With a view to establishing a bonded cold storage in Yokohama following those of Kobe and Osaka, a promotor group has applied to the Customs Authorities of Yokohama for lease of a building site covering 400 tsubo in the customs compound.

The company will have a capitalization of Y.200,000 with 10,000 shares each Y.20 in face value. A re-inforced concrete building will be constructed at a cost of Y.111,000. The company will also handle, it is reported, sale on consignment of those merchandises submitted and finance thereof, ice manufacturing and its distribution.

Among those commodities handled in a year through the Yokohama Customs that which need refrigerater are 4,500,000 piculs of beef, vegetables, eggs, cow hides, sheep skins, must be kept in the cooler reaches 1,300,000 litres.

JAPANESE ELECTRIC WIRE MAKERS EXTEND EQUIPMENT.—Japanese Manufacturers of electric wire and cable are getting busy, due to constructions and improvements of power transmission systems and the development of electrification in various fields, and their production has been steadily increasing. At the same time makers are achieving great improvements in engineering technics, as evidenced by the completion of 66,000 v. cable by Furukawa Desen and 154,000 v. overhead line manufactured by Sumitomo under using foreign patents. Hitachi Seisakujo is also planning extensions to manufacture covered wire, while Fujikura Densen has plans to instal a 1,000 h.p. millmotor in order to increase the capacity of its Fukagawa Mill, Tokyo.

COLD STORAGE WORKS AT KEPPEL HARBOR.—At the new works of the Fresh Food and Refrigerating Co. the ice is made by two 180 horse-power engines of the Merrless, Bickerton and Day type, capable of manufacturing 80 tons of ice per day. The supply is divided into two sections, 50 tons being made in ice tanks in a specially provided room for the purpose of retail sale, and 30 tons kept to retain the desired temperature of the cold rooms.

In the ice manufacturing department, where the actual blocks of ice could be seen, there were dozens of zinc tanks, all of a capacity of 300 lb. Three tanks are in rows of five, and immediately one row is ready, a small electric crane lifts it away, to a place where it is automatically thawed sufficiently enough to remove the blocks from the tanks. Thus, in the space of a few minutes, fourteen 300 lb. blocks are ready for disposal. The most up-to-date methods of hygiene are employed, and care is taken that the ice is not touched by human hand from start to finish. All the machinery is in duplicate, including the generating plant, by means of which the company makes its own electrical power.

The works were designed by Mr. G. L. D. James, who has installed similar institutions in a number of places in various parts of the world, while the installation was under the charge of Mr. B. C. Goudie. Mr. A. R. W. Butcher is managing-director of the new company, and Mr. J. Rafferty, works manager.

NEW BREWERY, SINGAPORE.—Last year Malaya imported ale and beer to the value of $2,200,814, and porter and stout to the value of $2,134,595. It is hoped that a substantial portion of this trade may be secured by Singapore Brewery, Ltd., a new company recently floated. The nominal capital of the company is $750,000, in $1 shares, and 450,000 shares were issued. Larger beer, English ale and stout are to be brewed. The plant contemplated would be capable of an output of 40,000 cases a year.

PHILIPPINE MILLS EXPANDING EQUIPMENT.—Three of the largest centrals in the islands are adding extensive improvements in order to increase their daily capacities to 3,500 or 4,500 tons of cane. The Binalbagan central will then be the largest mill on the island of Negros. The milling plant is a tandem 19-roller mill electrically driven. There are two centrals in the islands with electric mill drive.

Extensions in the Del Carmen plant will increase the capacity to 4,000 tons of cane daily. The Calamba mill is installing a tandem crushing plant with crusher and five three-roller mills. With this additional crushing machinery it is believed that the extraction will be much improved.

MITSUBISHI WILL ESTABLISH OIL REFINING COMPANY.—The Mitsubishi Trading Company has formed a new company to manufacture gasoline and other refined oils, with a capital of Y.10,000,000. The present oil department of the company is to be taken over by the new concern. A factory site has been purchased from the Tokyo Bay Reclaimed Land Company covering 33,000 tsubo near Tsurumi, Yokohama. The construction of the plant will be started about March next year.

The oil supply will be obtained from the Associated Oil interests which the Mitsubishi represents in Japan. Those oil tankers belonging to the company will be employed in the transportation of the crude and heavy oil across the Pacific.

TO CONSTRUCT MANY FISH CANNERIES.—The Central Concessions Committee, has agreed to and signed 22 contracts, approved by the Soviet Government for the purpose of erecting fish canning factories in Kamchatka,

Of these, 19 were concluded with the Nichiro Gyogyo Kabushiki Kaisha, a Japanese firm. Each contract provides for the establishment of a factory employing from 100 to 600 persons.

From each box of canned fish, the Soviet Government will get a certain amount as royalty, this amount being fixed in the contract. In addition, a certain rent has to be paid for the right of using certain fishing allotments. The amount for this is determined after a public auction of these allotments. It is calculated that the rents will net the Soviet Government over 600,000 roubles a year.

Concessionaries have to conform strictly to all existing laws and regulations in the USSR and all the contracts are for a period of ten years, up to December 1, 1938.

RAILWAYS

TRAMS AT MUKDEN.—Mayor Li Teh-sin of Mukden, holding ex-officio the Superintendency of the International Settlement Office, is planning to build a tramway to facilitate communications between the International Settlement and the South and North market places, Mukden. This new proposition will cost $700,000.

TO BUILD LIUYUANKO-KAIFENG LIGHT RAILWAY.—In order to utilize the famine labor and to facilitate means of communications, the Bureau of River Works of Honan province has recently projected plans to build a light railway, connecting Liuyuanko, on the southern bank of the Yellow River, and Kaifeng. Work will commence as soon as appropriations are made.

NEW MUKDEN-FAKUMEN RAILWAY. The Chinese proposition to lay a railway between Mukden and Fakumen is taking shape, and the work is expected to be finished by May next. ... foreign capital will be accepted.

THE LINAN-KOCHIU RAILWAY, YUNNAN PROVINCE, COMPLETED.—The Linan-Pisehehai portion of the Linan-Kochiu Railway, Yunnan Province, under construction of the Pisehehai-Kochiu-Linan Railway Company, has been completed, the Kochiu-Pisehehai portion having been open to traffic for some years. A direct service from Linan to Kochiu commenced on November 22.

NEW EXTENSION OF TAONAN-ANGANGCHI LINE.—The work connected with the intersection of the C.E. Railway track by the new extension of the Taonan-Angangchi Line north to Tsitsihar has been completed. From December 14, provisional traffic was to be opened right up to Tsitsihar. While the through traffic arrangements are still under negotiation, the Chinese city of Tsitsihar is now made accessible by railway on the new Taonan-Tsitsihar Line, of which the Taonan-Angangchi section has formed part.

KOTO RAILWAY.—Tadaichi Matsuda, of Nishinomiya City, in Hyogo Prefecture, and others are promoting a new railway company, to be known as Koto Tetsudo K.K. (Lake East Railway Co., Ltd.) and has applied for the necessary license. The plan is to construct an electric railway from Yawata Mura, Kanzaki Gun, Shiga Prefecture—in front of Notogawa Station on the government line—to Yokaichi near the Third Air Regiment. The distance is 5 miles 45 chains.

Capital will be Y.400,000 (8,000 shares, Y.50 face value). Head office: Minami Gokasho Mura, Kanzaki Gun, Shiga Prefecture.

PUBLIC WORKS

HUAI RIVER AND GRAND CANAL CONSERVANCY PROJECT.—An elaborate project for the conservancy of the Huai River and the Grand Canal, which form the main waterways in Kiangsu province, has been submitted by the Kiangsu Provincial Government to the Central Council for approval. The project advocates digging branch canals as feeders to the Huai River and dredging for the Grand Canal. The cost of the Huai River scheme is estimated at $50,000,000, of which $34,000,000 for widening the Huai River shall be provided by the Central Treasury, and $16,000,000 for digging various small canals by the Kiangsu Provincial Treasury. The total construction expenses of the Grand Canal is estimated at approximately $24,000,000, to be shared equally by the Central and the Kiangsu Provincial Treasuries. It is also urged that in view of the multifarious traffic in these waters, work on the Grand Canal conservancy should be started as soon as possible and before that on the Huai River.

LARGE BRIDGES IN INDIA.—During the heavy floods on the Malabar Coast, S. India, in 1924, the Old Kuttupoya Bridge was demolished. The whole hillside slipped in front of the bridge and when the water level rose to a height capable of over-topping this obstruction, it fell upon the bridge below and deposited an avalanche of floating trees and debris.

The new bridge, which is said to be the largest single span in reinforced concrete in India (160 feet) is located on rocks about a furlong above the hill slide. It is considered likely that the new approach road through the hill slide may now have completely stopped slipping, and Armco culverts were chosen for this road as they can be readily taken up and reinstalled without suffering in any way should another slip occur. Shown in the accompanying photographs are the new bridge while yet under construction and one of the culverts installed in the approach road. The new bridge and roadway have a width of 14 feet.

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THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

遠東時報

上海仁記路拾六號

MANCHURIA

By GEORGE BRONSON REA

NEW STEEL MILL FOR MANCHURIA

ELECTRICAL UNDERTAKINGS IN MANCHURIA

SOUTH MANCHURIA RAILWAY
NEW COAL PORT

FUSHUN SHALE OIL PLANT

BEANS

NEW SOUTH MANCHURIA RAILWAY
SODA ASH INDUSTRY

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The Far Eastern Review

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VOL. XXV SHANGHAI, FEBRUARY, 1929 No. 2

Rehabilitation—China's First Political Problem

By George E. Sokolsky

MOST Chinese and many foreigners insist that little can be accomplished for the stabilization of China until the country has been unified under a single, powerful, Central Government. The general political tendency of the national Government in Nanking is to fight every evidence of regionalism even to the extent of attempting to stamp out provincial identities. Regionalism is regarded as a disease, a curse which the militaristic feudal period has left as a legacy of evil.

Yet, the fact remains, that the enormous continent of China resists such unification; every political tendency is towards decentralization, towards that very regionalism which the Kuomintang attacks most savagely. The size of the country, the varying characteristics of the people, the differences in speech—all these foster regionalism. But infinitely more important is the broken-down physical basis of Chinese economy, the debilitated railways, the lack of highways, the absence of airways and the fast silting-up waterways. These are the fundamental causes for the weakness of the country, for even if the Government were sufficiently powerful to enforce its will, even if the crops were plentiful, even if there were a well-organized industry to supply the interior with manufactured goods, the means of communication are inadequate to make for an efficient and ample distribution of forces and goods.

There are about 7,000 miles of railways in China for 4 million square miles of territory. The mileage has not increased in a decade of revolution and civil war. The rolling stock has been ruined by soldiers, the road-beds have been neglected. Mr. Sun Fo, Minister of Railways, then, has taken over the country's most difficult and most fundamental task. He has not only to rehabilitate the existing roads, but he must increase the mileage of the railways, he must develop a railway system which will connect the rising industrial centers with the agricultural areas, which must consume the goods manufactured in the large cities. Tariff autonomy, the stabilization of the currency and other fiscal reforms which Mr. T. V. Soong, Minister of Finance, plans to make effective, cannot serve China unless simultaneously, the means of communication are so increased and improved as to modernize the physical basis of life in China. For instance, it is to be presumed that tariff autonomy will result in an increase of factories and mills engaged in the manufacture of goods which were heretofore imported from foreign countries. China can neither make the fullest use of her raw materials or of her manufactured goods as long as inadequate communications prevent a free and rapid interchange of commodities.

It would appear that one of the initial errors in organization is the division of the means of communication into at least two ministries for political reasons. There should be one ministry in charge of ways—railways, highways, waterways and airways, so that a single, co-ordinated scheme might be worked out for the rehabilitation and improvement of all means of communication at the same time. For instance, an airway might connect two railways; roads should be constructed as feeders to railways and rivers; waterways should be improved according to the traffic they are to bear. In a word, the means of communications should be created to utilize all agencies to their greatest efficiency for the development of the commerce of the country. The communications problem is economic, not political. Upon it depends the movement of China from a ricksha to an aircraft culture.

It is often suggested that it is impossible for financiers to invest their capital in China because of the lack of security, but, on the other hand, unless the railroads of the country are developed, there will never be security. The problem, then, is to work on a formula which will bring to the financiers that security which they seek and which will, at the same time, provide China with the railways that are essential to her future developments. Mr. Sun Fo is apparently working along those lines and he will have the

(Continued on page 55).

Sun Fo, Minister of Railways

New S.M.R. Soda-Ash Industry

50,000 Ton Plant to be Erected near Dairen

THE new economic policy of the South Manchuria Railway Company is finding expression in the erection of several important industrial plants. In addition to the shale-oil distillation plant, steel mill and nitrogen enterprises, the S.M.R. is also launching this year, a soda-ash industry that is expected within a few years to free Japan from further dependence upon outside sources for this commodity. The basic material for the manufacture of soda-ash is salt, whose high cost of production in Japan has adversely affected the successful development of soda manufacture in that country.

The Kwantung Leased Territory is exceptionally favored for the production of salt. The climate is fairly dry with long summers and plenty of sunshine. In 1925, the area of the salt fields within the Leased Territory was about 15,200 acres, but it is possible to create new fields along the coast, of over 25,000 acres, producing from 600,000 to 800,000 tons of salt per annum. In 1925, the total output of salt from the Territory was 275,000 tons, out of which 205,000 tons was exported to Japan and Korea.

The present demand for soda-ash in Japan is about 120,000 tons per annum, of which only 20,000 tons are produced at home, the balance being imported (Importations of soda and soda-ash in 1927 was 110,000 tons valued at Y.6,540,000. Most of this supply came from England through Brunner, Mond & Company).

Taking advantage of lower costs of salt production in Kwantung and the possibility of creating an industry that in a few years will supply the amount of soda-ash now imported into Japan, the S.M.R. will organize a new company capitalized at Y.5,000,000 to engage in this business. All the shares are to be subscribed for by the S.M.R. and allotted to the public on application. It is understood that the S.M.R. will guarantee 5 or 5½ per cent. dividends on this capitalization for a period of ten years. The plant to be erected is to have an initial capacity of 50,000 tons, or sufficient at the outset to take care of half the present importations in Japan. Preliminary studies and investigations for the establishment of the new industry have been carried on over a period of years, not only by the Railway authorities, but by the Kwantung Government and the foremost chemical experts of Japan. The factory is to be located within the Leased Territory, either at Chinchou or near Dairen. The actual site has not yet been decided upon.

"The Outline of the Kwantung Government," an official pamphlet issued in 1926, states that "salt can be produced in the Leased Territory at such low cost that the future of the soda-ash industry seems exceptionally promising. The production cost of salt in the Kwantung Province is estimated at about 15 sen per 100 pounds, whereas it is 14 times greater in Japan proper." This would make the cost per ton about Y.3.00. On the other hand, Mr. T. Imai, superintendent of the Kwantung Industrial Office in a report on the soda-ash industry published in the *Manchuria Daily News* of June 1, 1927, gives the cost of production at 40 sen per 100 kin (132 lbs.) or Y.6.80 per ton. These figures are probably correct as another report on the Kwantung Salt Industry published in March, 1928, gives the cost of Yinchengtzu salt shipped from Port Arthur at Y.7.99 and Pulantien salt shipped through the same port, at Y.9.43.

For the last ten years the Kwantung salt industry has been undergoing considerable hardship owing to the operation of the Sino-Japanese Agreement signed in February, 1926, which provides for the export of 210,000 tons of Tsingtau salt to Japan and 100,000 tons to Korea in three years time. The dumping of this Chinese salt on the Japanese market at prices considerably lower than the cost of the Kwantung product, practically suspended operations in the latter territory. Tsingtau salt was quoted at Y.7.06 per ton against Y.7.99 and Y.9.34 for the Kwantung product and, in addition, had an advantage of 30 to 50 sen per ton in the freight rate to Japan. In order to compete, the Kwantung producers have had to combine to improve their methods all along the line and install mechanical loading and handling devices. The competition of salt from Great Britain, Germany, Spain and Egypt has also aggravated the situation for the Kwantung producers.

The present consumption of soda-ash in Japan is 120,000 tons per year and as the industries of the country expand the demand is bound to increase. There are only two soda-ash factories in Japan, one belonging to the Japan Soda Company, Ltd. and the other to the Asahi Glass Company. The former has a capacity of 12,000 tons but the high price of salt has compelled it to remain idle most of the time. The latter produces about 18,000 tons per year turning out a high class product which is largely consumed in the manufacture of glass in the company's own factories.

The materials consumed in the manufacture of one ton of soda-ash are ; 1.8 tons salt, 1.35 tons limestone, .016 ton of sulphate of ammonium : 16 ton of coke : 7 ton of coal : 20 tons of fresh water and 80 tons of sea water. The most important item is salt, and because of the high prices for this commodity ruling in Japan none of the soda-ash ventures have to date been successful. It is estimated that the soda-ash industry in Japan can be made profitable provided salt costs not more than 40 sen per 100 kin, or Y.6.80 per ton. In March, 1924, the Financial and Economic Commission of Japan passed a resolution urging the Government to subsidize the soda-ash industry by making up the difference between the above figure and the market price. The government salt monopoly fearing to create preferential treatment to one industry that might create a precendent for further subsidies, has failed to act upon this resolution. The fact that salt could be produced in Kwantung at the theoretical cost necessary to profitable soda-ash manufacture relieves the government of making concessions at home and encouraged those interested in backing the plan to establish the new industry in Kwantung. The salt producing capacity of this territory is more than sufficient for all the soda-ash requirements of Japan and even to compete with Europe for other Far Eastern markets. By reason of its inclusion in the Kwantung Preferential Tariff List, soda-ash produced in the Leased Territory, enters Japan free of duty, while imports from other countries pays Y.5.80 per ton. This perference however, is not considered sufficient if the foreign chemical combine attempts to maintain its dominant position in the trade by dumping their product on the Japanese market. To forestall this possibility, an anti-dumping law is being urged in Japan as well as a higher protective tariff as soon as the Kwantung industry reaches a point where it can supply home demand of 100,000 tons.

New Nitrogen Plant

As noted in the article on the Anshan Iron and Steel Works, the S.M.R. will erect this year a new sulphate of ammonia and nitrogen plant at Anshan, utilizing the waste gas for fuel. Although the exact information is not available as to the size of the plant and its output, the capital required will be Y.15,000,000 on which the S.M.R. will guarantee the same rate of dividend to the shareholders as in the soda-ash industry.

Rehabilitation—China's First Political Problem

(Continued from page 49)

advice of Mr. W. B. Poland, the railway expert of the Kemmerer mission, who is a man of such unusual abilities and knowledge that there can be little doubt but that he will envisage the problem as a whole and find a solution for it. The railway problem in China cannot be dealt with as a question of investing small amounts for single lines nor can it be dealt with from the standpoint of political strategy by foreign Powers. There must be a large comprehensive program which shall be financially sound and at the same time serve the best interests of the Chinese people, who, after all, will be the users of the roads. Any other method will only continue the chaos which exists at present.

BEANS

Their Relation to Manchuria's Prosperity and New Railway Construction

By George Bronson Rea

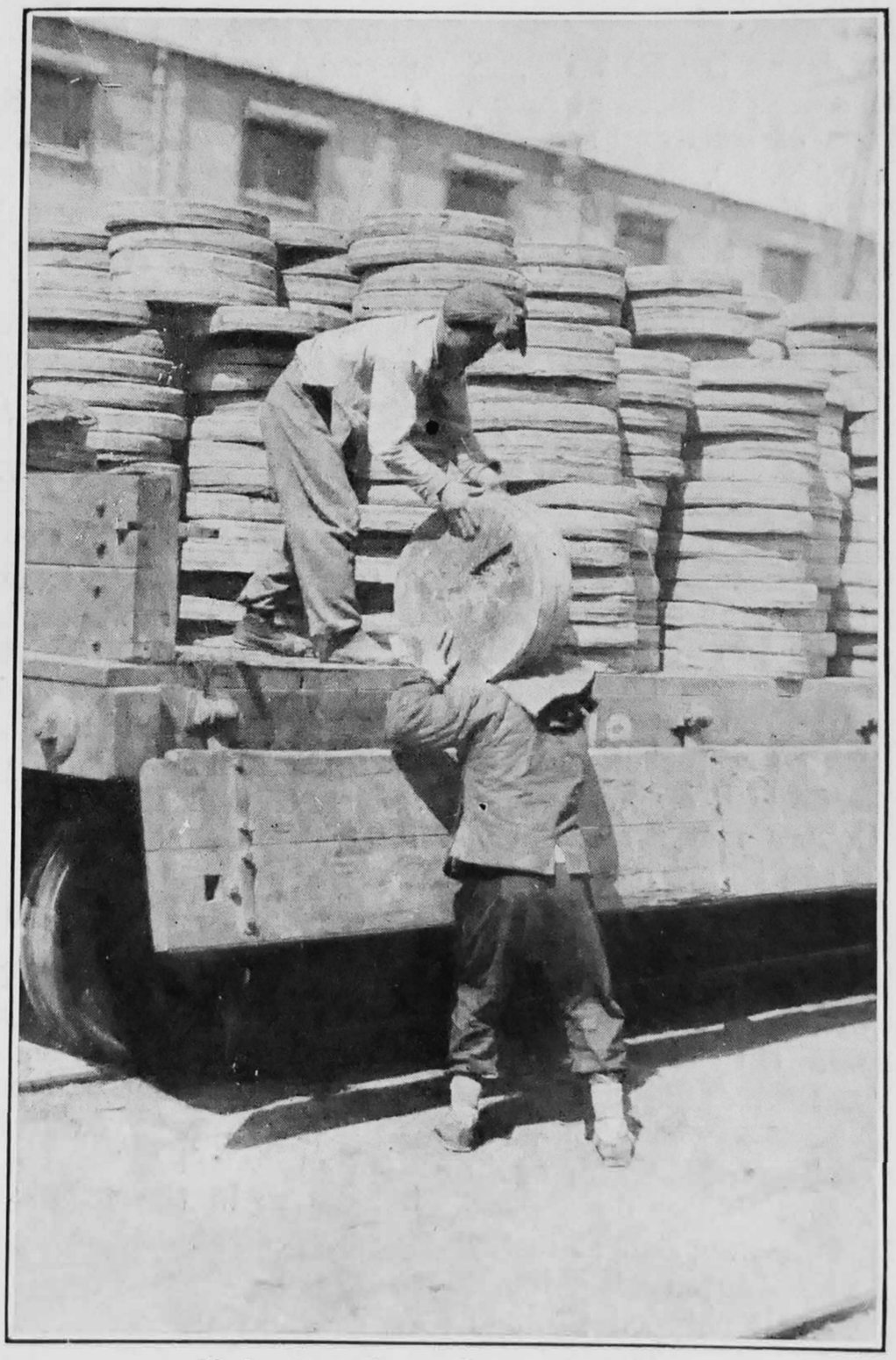
FOR many years, Japan has relied largely upon bean cake imported from Manchuria, as the chief fertilizing material for her rice farms. In fact, the prosperity and development of Manchuria is based upon the cultivation of the soya-bean, the extraction of its oil and the use of the residue for fertilizing and other purposes. Before the Japanese created a market in Europe for this product in 1907, Manchuria was a sparsely populated waste land with no economic outlook.

The latest trade statistics show that in 1927, of the total exports from the port of Dairen valued at Y. 217,000,000, forty per cent. consisted of beans and bean products, 41 per cent. of coal, 9 per cent. of cereals and seeds and 10 per cent. of sundries. Importations of Manchurian bean cake into Japan for 1927 were 1,176,468 tons valued at Y.88,000,000 or 30 per cent. of the total value of all the exports through the three principal ports of Dairen, Antung and Newchwang. The following figures will help to a better appreciation of what Japan's consumption of bean cake means to the general prosperity of Manchuria. The Manchurian bean crop for the last three years has averaged over 5,000,000 tons per year, valued at 450 to 500 million Mexican dollars. The disposition of the 1926 crop was approximately as follows:

Crop, North Manchuria, 3,300,000 tons; South Manchuria, 2,200,000 tons: Total Crop, 5,500,000 tons.

Export of beans	..	1,900,000 tons
,, ,, cake	..	2,250,000 ,,
,, ,, oil	..	150,000 ,,
Local consumption	..	242,000 ,,
Local Fodder	.. ..	363,000 ,,
Seeding	.. .. ..	495,000 ,,
Carried over	.. ..	100,000 ,,
Total	.. ..	5,500,000 ,,

These figures show that approximately one half the total bean crop of Manchuria is passed through the local bean mills extracting about ten per cent. of the weight in oil and leaving a residue of 2,250,000 tons of cake, of which, about 60 per cent. goes to Japan. The balance of the bean cake goes to South China where it is also used as fertilizer and some to Europe and America where it is used as cattle fodder. Out of a total crop of 5,500,000 tons, about 22 per cent. or 21,200,000 tons are consumed locally while 4,300,000 tons, or 78 per cent. are exported in the shape of beans, cake and oil. Of the 2,250,000 tons of cake exported, more than half goes to Japan. The consumption of bean cake in Japan therefore represents one quarter of the total crop available for export and adds 110 to 125 million dollars to the wealth of the Manchurian farmer.



Unloading Bean Cake at Dairen

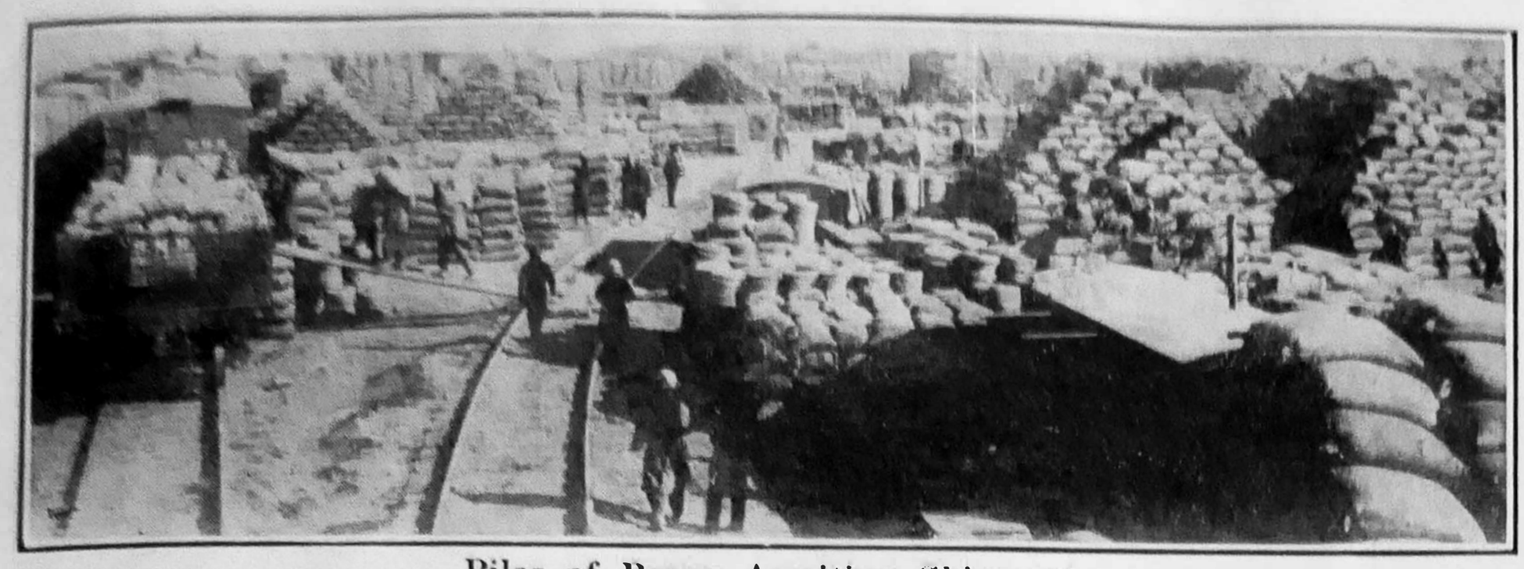
These figures prove that the prosperity of Manchuria rests firmly on a foundation of beans and coal. Now, with one exception (the Penshihu coal mines) the coal mines which furnish 41 per cent. of the exports, are owned by the South Manchurian Railway and do not contribute to the general welfare of the farming population. The bean crop and the market price of beans constitute the one source of income for the Chinese farmer and the government he supports through his taxes. Any dwindling in the export demand for bean oil and cake must react unfavorably on the general welfare of the Chinese farmers and the government of the Three Eastern Provinces.

The Chinese are reluctant to admit that Japanese initiative opened up an export market for soya-beans that has made possible the tremendous development and enrichment of North and South Manchuria during the past twenty years. In denouncing Japan for "exploiting Manchuria and attempting to annex the territory under cover of her economic necessities," the Chinese give no consideration to the operation of economic and industrial laws that may once more change the entire aspect of the Manchurian problem. They fail to realize that the prosperity of Manchuria is erected upon a foundation laid by Japanese masons and that what Japan has so carefully built up, she can just as easily demolish. For unless all signs fail, China will soon have to find other uses and markets for her bean oil and cake or face economic ruin in Manchuria.

The handwriting is writ large upon the wall. Within the next five years, Japan will have little further use for bean cake as fertilizer. Unless new markets are found for the cake, the oil milling industry in China is doomed. Extraction of the oil alone is not enough to justify the continued operation of the mills. The tendency of the United States and other vegetable oil producing countries to protect their own industries has already adversely affected the prosperity of the oil mills in Manchuria, cutting down their profits to the vanishing point.

In fact, what was once a highly prosperous industry is now moribund, with little hope for its resuscitation. Four years ago there were 448 oil mills operating in North and South Manchuria capable of turning out over a half-million pieces of cake daily and 2,654,000 kin of oil. Many factors have contributed to the decline of this industry, the principal one being that the Chinese, in pursuit of money with which to carry on their internal wars, have deliberately killed the goose that laid the golden eggs.

The bean industry was built up by the Japanese on the natural law of supply and demand, prices being regulated entirely by prevailing markets and crop conditions. In recent years, this basic law has been set aside and the price of beans arbitrarily fixed by a group of Chinese banks and transport companies acting as agents for the Mukden, Kirin and Heilungkiang Governments. Backed by the full powers of autocratic warlords, these agents cornered the bean crop in advance, compelling the farmers to sell their produce at the price fixed by the combine and accept inconvertible paper notes in payment. This official interference with the natural laws of trade enabled the official combine to corner the crop and without regard to whether bean cake was quoted low in Japan or bean oil was cheap in Europe, to hold it for high prices. The bean



Piles of Beans Awaiting Shipment

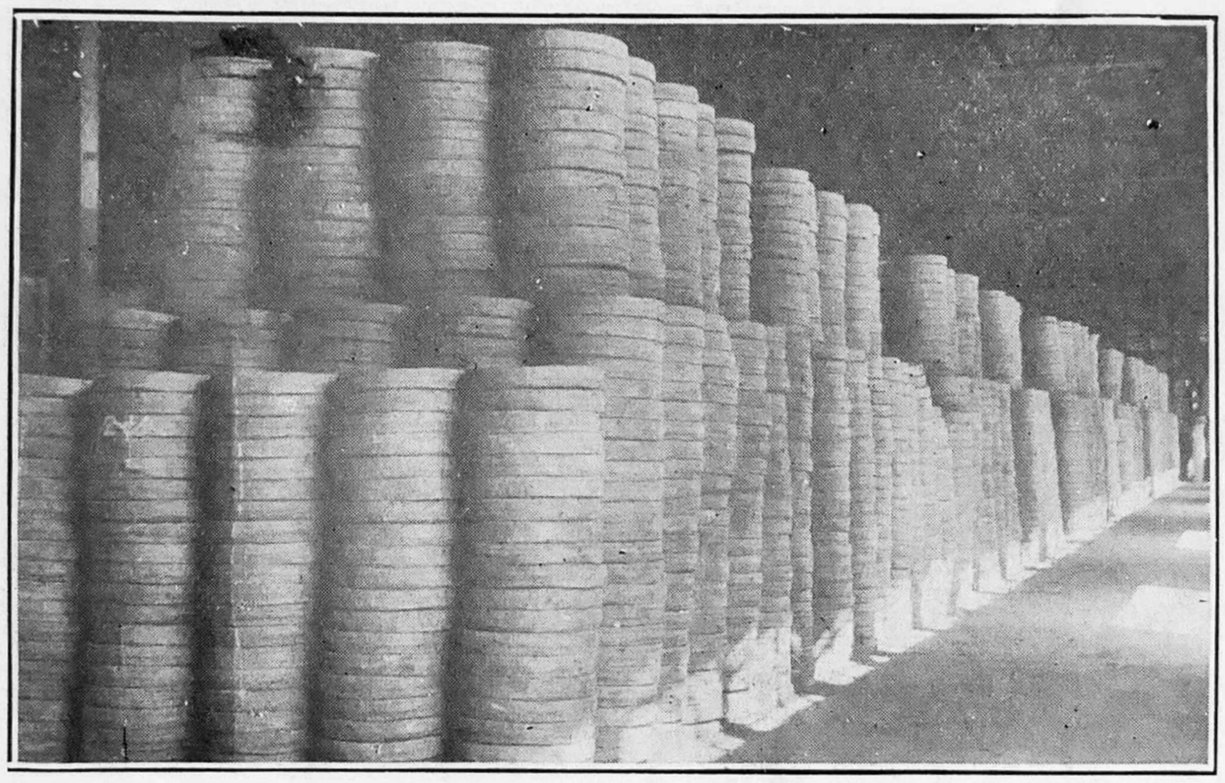
mill owners, in order to keep their factories going, have had to buy the beans dear and sell the oil and cake cheap ; in other words, to operate at a loss. The end of the road is near. They are now facing ruin.

That is only one side of the story. The other side presents an appalling picture of official rapacity and organized theft. For many consecutive years Manchuria had prospered. An era of peace, security and profitable trading under the assured protection of Japan, piled up an immense store of wealth for the Chinese farmers and merchants. Then Chang Tso-lin and his generals determined to conquer the rest of China and found a new dynasty on the ruin of the so-called republic. To do this, they needed lots of cash. There was only one place to get it ; from the people. So Chang and his satraps in Kirin and Heilungkiang started the printing presses working overtime and turned out enormous quantities of paper money, even down to five cent shin plasters. The officials directing the bean monopoly forced these unsecured and irredeemable notes on the farmers in payment for their crops, under threat of imprisonment or worse. The beans so collected were stored by the government manipulators, held for high prices and sold for hard cash. In this way, Chiang Tso-lin and his Manchurian war-lords procured the money to pay for their arms and munitions and prosecute the war against the Kuomintang. They drained the Three Eastern Provinces of silver and left in its place tons of worthless paper. The average bean crop of Manchuria is worth about $500,000,000 silver. These crops are all raised by Chinese farmers who were forced to sell at prices fixed by the monopoly and accept payment in worthless paper. This system of highway robbery has been going on for the past four or five years during which over two billion dollars in worthless paper has been exchanged for the bean crop alone, not to mention other produce. With this background, we begin to have some idea of the enormous amount of irredeemable paper now circulating in Manchuria. There is no official data upon which to base even an approximate estimate of the amount issued. The Chinese authorities refuse to publish an official statement but the following estimates have been given out by responsible Japanese banking experts :

	Issued	Exchange Value in Yen
Fengpiao (Notes issued by the Mukden Government)	1,000,000,000	48,000,000
Kirin Notes	3,000,000,000	17,000,000
Heilungkiang Notes ...	2,500,000,000	7,200,000
Harbin Notes	45,000,000	35,000,000
Total	$6,545,000,000	107,200,000

The Fengpiao is therefore worth 20 to the yen or about five cents silver ; the Kirin Notes, 180 to the yen, makes their value about one half cent silver while the Heilungkiang issues quoted at 350 to the yen is so much dirty paper hardly worth its weight as junk. Allowing for exaggerations in the Japanese estimates, it is fair to assume that the Fengtien generals looted the provinces under their control of over five billions in silver in four years ! No wonder Chang Tso-lin and his generals could carry on a prolonged struggle for the mastery of China ; no wonder he could build railways and operate the largest arsenal in China. It cost him nothing. The looting of China Proper by other warlords was petty larceny compared with the wholesale operations of Manchuria's overlords.

However, the Fengpiao is only a side issue. This is a story about *beans*, so we return to our subject. The majority of the eighty bean mills in Dairen have been idle for a long time. Some operators have already quit the field in despair and engaged in other lines of business. It is only a question of time when the once prosperous bean-milling industry of Manchuria will be only a memory. England and Continental Europe will continue to buy soya beans in bulk if the price is right, but the extraction of the oil and by-products will be done in their own mills. The United States, at one time a heavy buyer of Manchurian beanoil, has practically ceased to be a customer. The American import tariff was raised a few years ago to protect the cotton-seed oil industry, and the farmers are again demanding legislation that will still further raise the duty on foreign vegetable oils. This will shut out the Manchurian product altogether from the American market. Let us now look at the problem from the Japanese view point.



Bean Cake Stored in a Dairen Warehouse

Japan is determined to solve her basic population problem by industrialization and, in pursuit of this policy, is building up her own chemical and artificial fertilizer industry. Despite many handicaps at the outset, the Japanese fertilizer manufacturers are rapidly placing their industry on a sound basis and it is only a question of a few years before they will be independent of foreign importations. The importations of sulphate of ammonium into Japan has risen from 92,000 tons in 1922 to 293,000 tons in 1926. When the fertilizer plants now under construction or planned are producing, their

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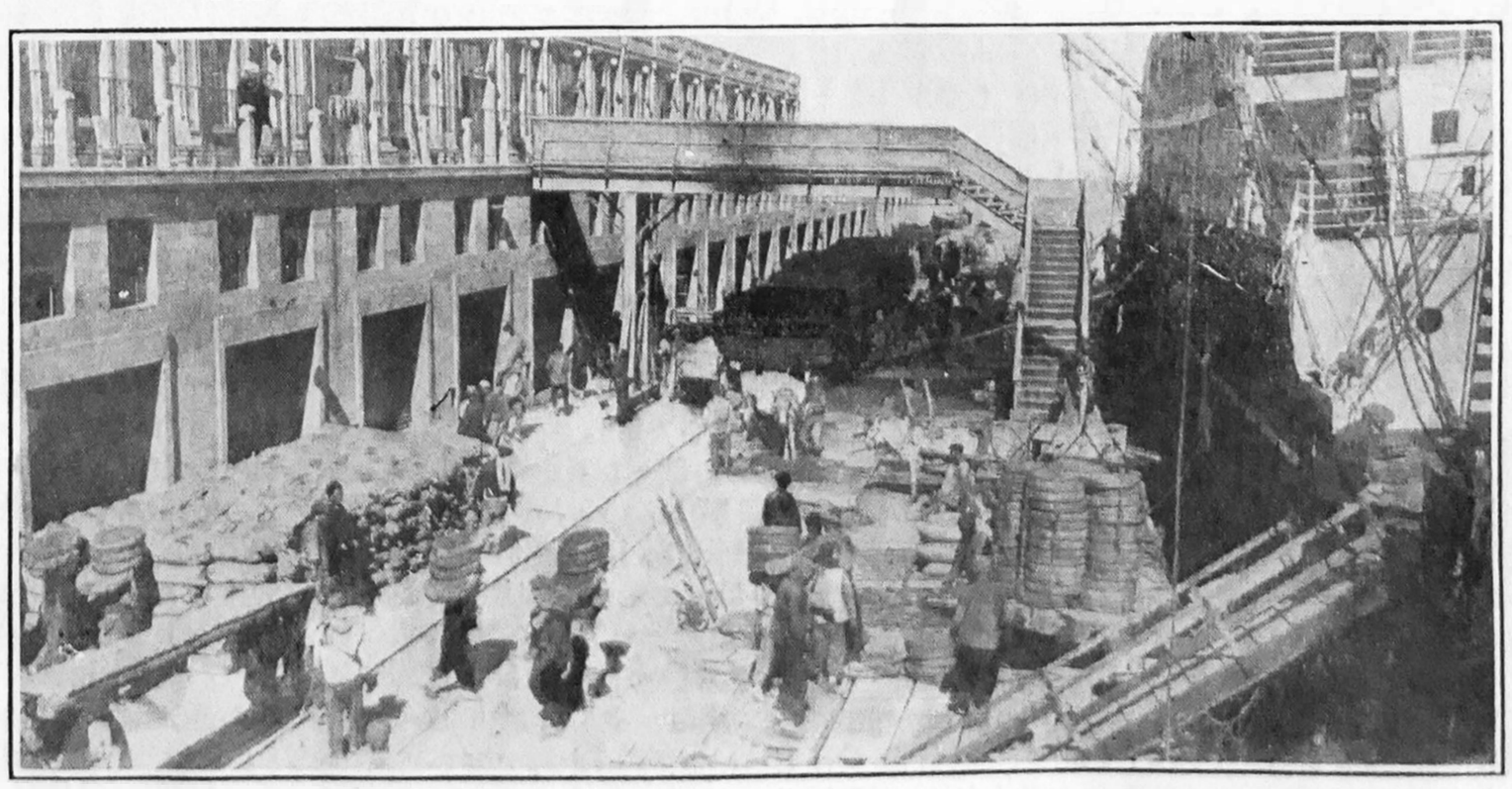
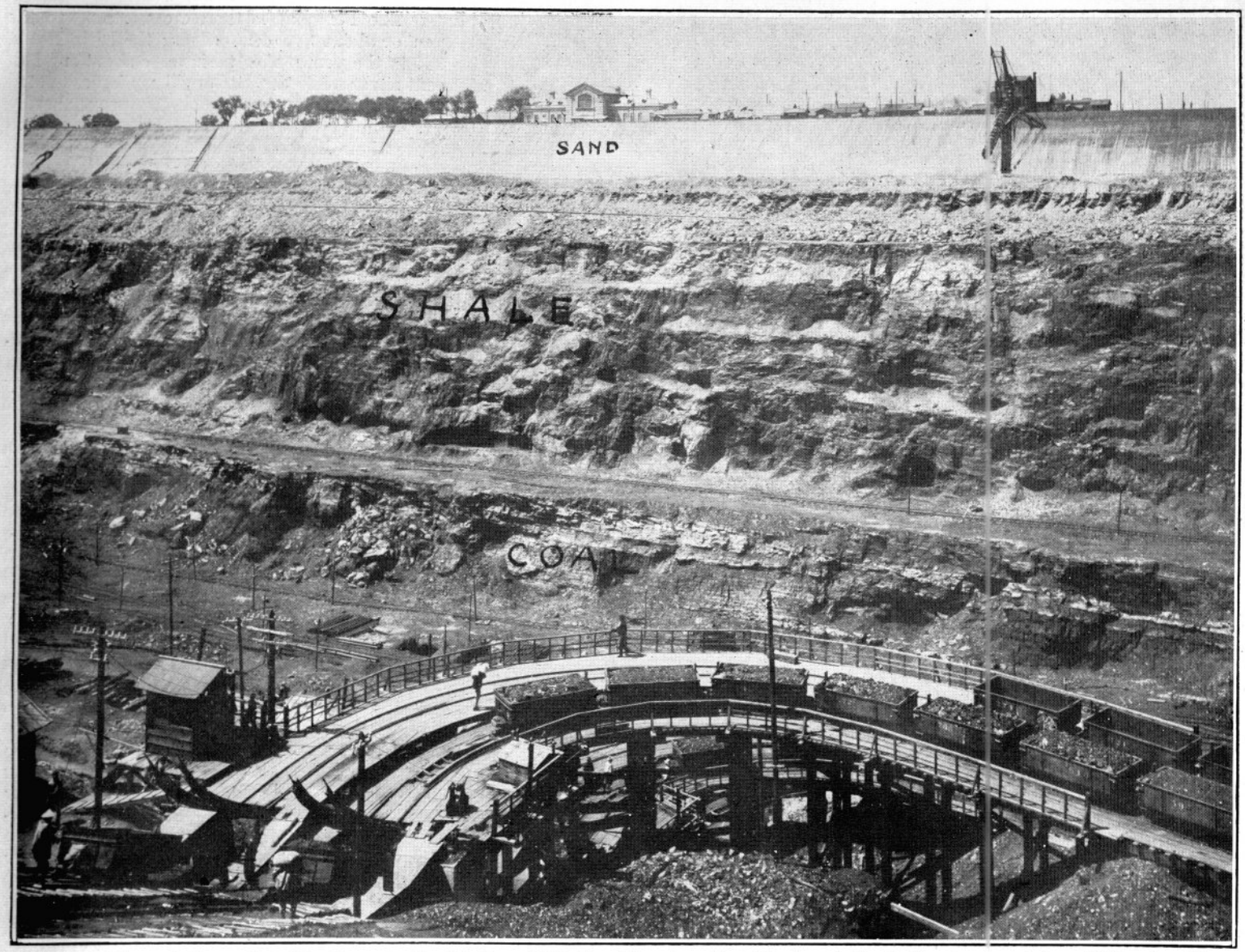


The Shipment of Bean Cake at the Wharf, Dairen



Typical View of Open Cut Working at the Fushun Collieries, Showing the Strata of Sand Overburden being Stripped with Excavators, the Shale Strata Above the Coal Seam and the Coal Cars Approaching the Incline to the Dressing Plant. The Illustration also Shows the Old Fushun Railway Station and the Town Behind it which Must be Demolished in Order to Proceed with the Stripping Operations

New Fushun Shale Oil Plant

AFTER several years of painstaking studies and experimental work, the South Manchuria Railway Company is now erecting at its Fushun Collieries, a shale oil distillation plant costing Y.10,000,000. The plant will handle 1,250,000 tons of shale per annum, yielding 50,000 tons of crude oil at four per cent. extraction, in addition to several other commercial by-products.

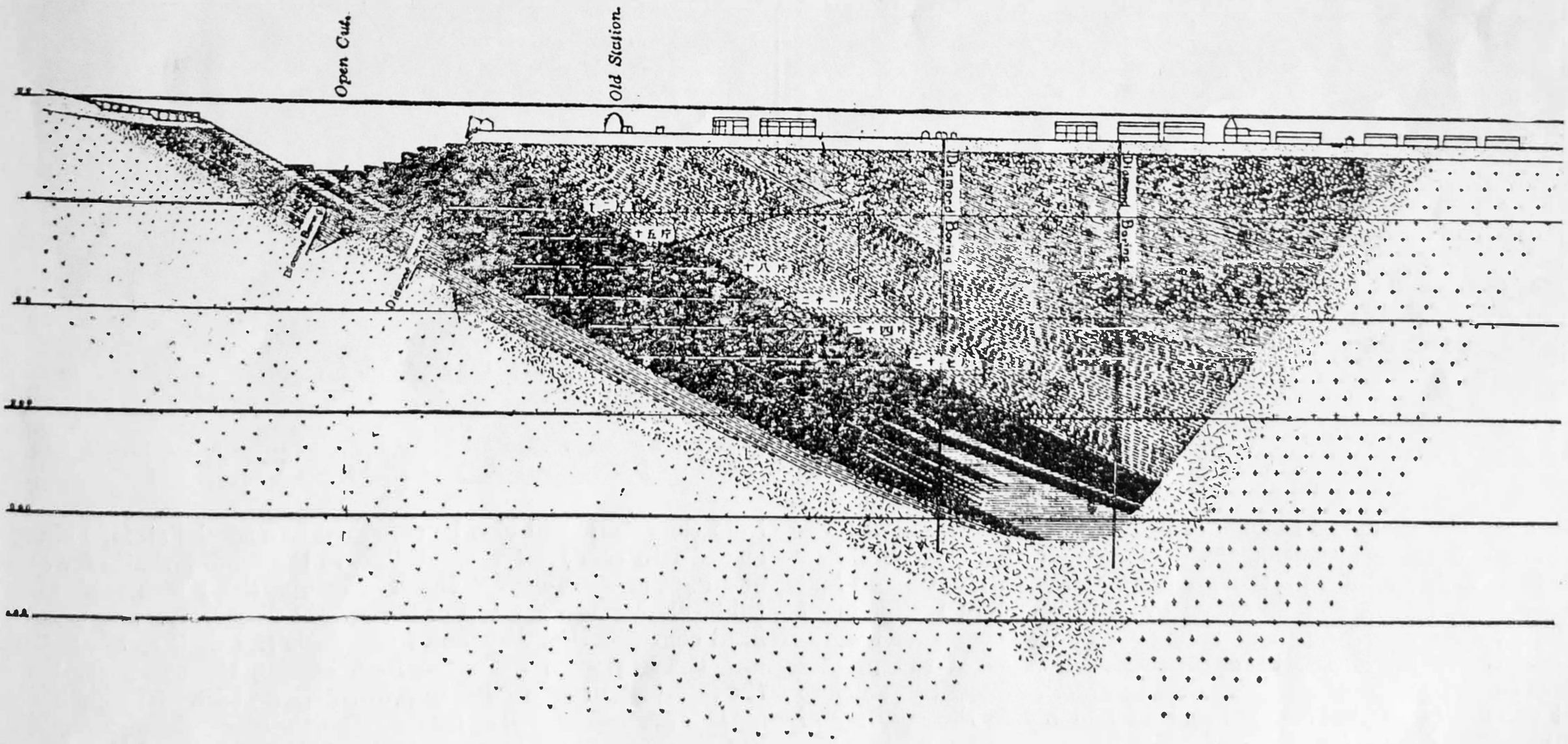
The history of this development goes back to 1909 (shortly after the Japanese began working the mines) when shale quarried at the Oyama Pit caught fire and disclosed the presence of an oil content which on the first analysis showed 2.6 per cent. of oil. Further tests carried out at the S.M.R. Central Laboratory at Dairen gave an extraction of 6 per cent. of heavy oil by the application of superheated steam. Large scale tests were then undertaken at the S.M.R. gas works in Dairen in 1920-21, but the yield was only 2½ per cent. These initial experiments seemed to indicate that the recovery was too insignificant to warrant the exploitation of the industry on a commercial basis. Nevertheless, the Railway's experts persevered in their studies. Mr. T. Kimura of the S.M.R. Central Laboratory, was sent to Europe where he spent several months at the works of the Scottish Oil Company, Ltd. near Edinburgh, while other experts visited all the principal shale oil plants in Europe and America in order to study the various systems of recovery. A thousand tons of Fushan shale were shipped to Scotland for testing under the Scottish dry distillation system. Other exhaustive tests were carried out at the Tokuyama Fuel Depôt of the Japanese Navy and by the Japan Fuel Association. Comparative tests were made with the Colorado and other American and European shales and various estimates of oil and by-products recovery arrived at. All these reports were received and studied by the Fushun engineers in charge of the work on the ground, who remained dissatisfied with the results obtained. They designed their own retorts and kept on experimenting until they finally evolved an entirely new system of recovery, which is claimed by them to be more economical in first cost, less complicated in operation and yielding a higher percentage and quality of oil and by-products. This system was developed and patented by Mr. Okumura, Superintendent of the Fushun Collieries in collaboration with his assistants, Messrs. Ohashi and Hasegawa and is known as the Fushun Internal Heating Method of Shale Oil Extraction. The superior advantages of the Fushun Internal Heating System over other extraction methods lies in the fact that no supplementary fuel is required. Owing to this, a less complicated furnace was made possible, lowering the initial construction cost over Y.1,500,000.

Another View of the Stripping Operations at the Fushun Open Cut Workings

In the Scottish system the only by-products recoverable are sulphate of ammonia and coke, while the Fushun process recovers the paraffine. The saving of the cost of coal fuel together with the elimination of the mining costs, materially cut down the working expenses and made possible the operation of the enterprise on a commercial basis.

In developing the new process, a series of exhaustive tests were carried out over a period of years. The system as finally approved and adopted for commercial practice, is based on subjecting the shale to a temperature of 1,000 degrees with superheated steam and condensing the gas so generated for recovering the heavy crude oil. Two different devices were tested for comparative study. By the first device, the lower half of the oven or retort was subjected to 1,000 degrees of superheated steam in order to generate a high temperature gas passing over the shale in the upper half of the retort. The resulting gas was then led through a pipe and passed through an air and water cooling device which liberated the heavy and volatile oils and the ammonia. The cooled gas was then fed back through a hole in the center of the retort, there mixing with the high temperature gas from the lower oven, thus maintaining a continuous gas feed without the use of any auxiliary fuel.

In the second device, the initial steam temperature was reduced and, after passing through the upper oven and being cooled, was reheated in a special tank before being fed into the center of the oven. Scottish, German and other European shales have a melting point much higher than 1,000 degrees. The Fushan shale melted at this temperature caused the experiment to fail. The steam temperature was then lowered to 1,000 degrees and it was found that at this heat a heavy oil of superior quality was obtained on condensation of the final gas.



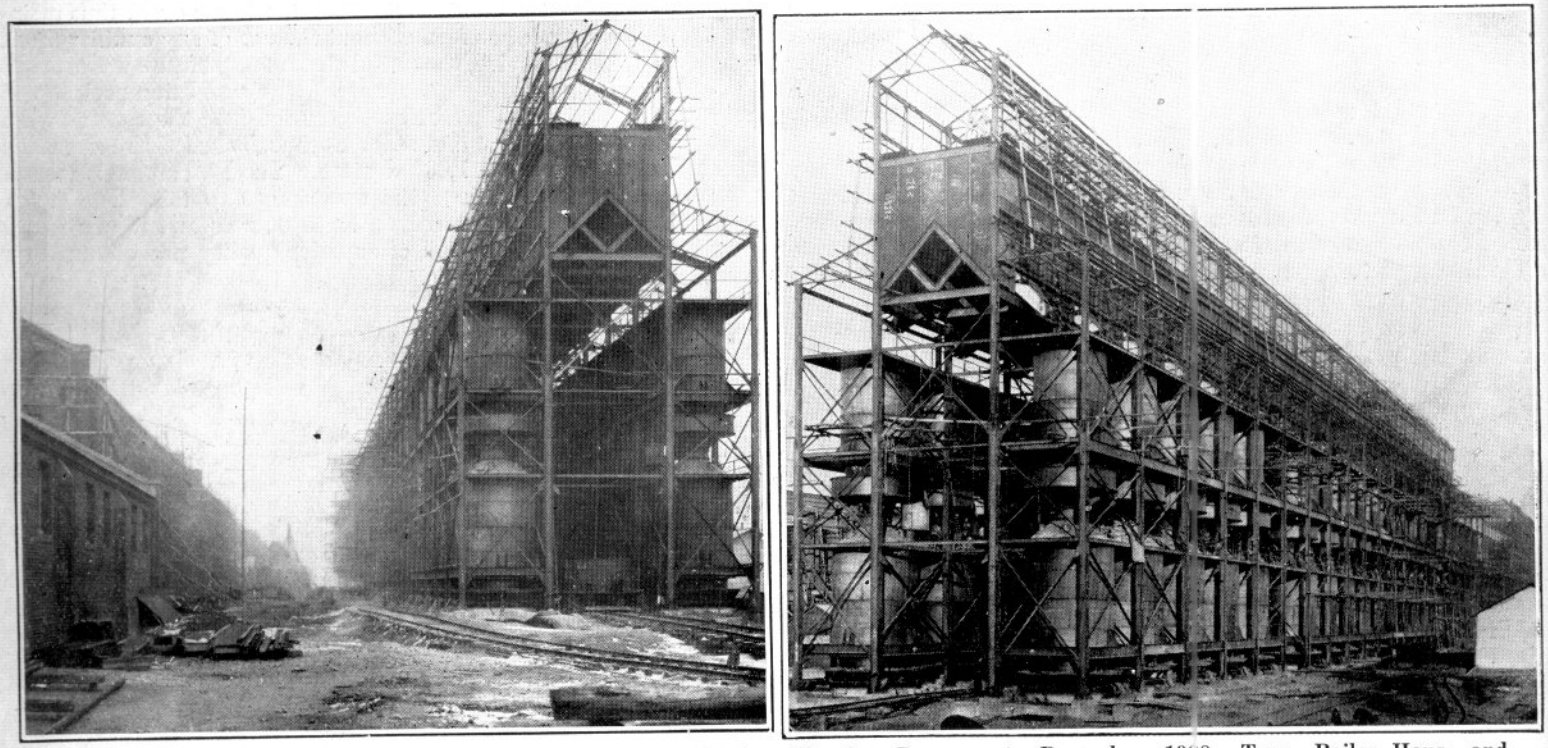
Cross Section of the Kei-Cheng-tze Open Working at the Fushun Colliery, Showing the Method of Mining

The experiments in the new Fushun retort showed that with 8 per cent. oil shale, considerable surplus gas was generated which had to be discharged into the air or burnt.

The experiments, carried on for over two years, were practically completed in March, 1927. At the outset, a small 10 ton furnace was employed, but in October, 1926, this was superseded by a 40 ton full-sized industrial unit and improved upon as the experiments progressed. The engineers in charge of the tests worked at times for days at a stretch in the laboratory without taking off their clothes to sleep. The experimental furnace was erected in close proximity to the Mond Gas Producer Plant of the Fushun Colliery in order to utilize the gas from the nearby coke ovens. The 40 ton furnace treated about 43 tons of shale per day with an oil recovery of about 97 per cent. of the total oil content.

by the Manchuria Dock Company of Dairen. The shale is to be transported from the Open Cut Workings by direct railway connection. For this service 60 special 60 ton steel dumping cars costing Y.14,000 each have been purchased from the Magor Company of New York through the Mitsui Bussan Kaisha. These cars are now being erected at the Fushun Colliery Machine Shops. It is understood that the initial order will be duplicated later on.

These cars will discharge the shale into a storage bin which feeds the crushers. There will be two sets of crushers having a total capacity of 10,000 tons a day (one a Fairbanks and the other a Simonds) set to crush the shale to pass through a ¾ inch mesh, this being found the best size for treating in the retorts. The larger and smaller sizes passing through the crushers are to be used for sand-flushing in the mines. The spent shale

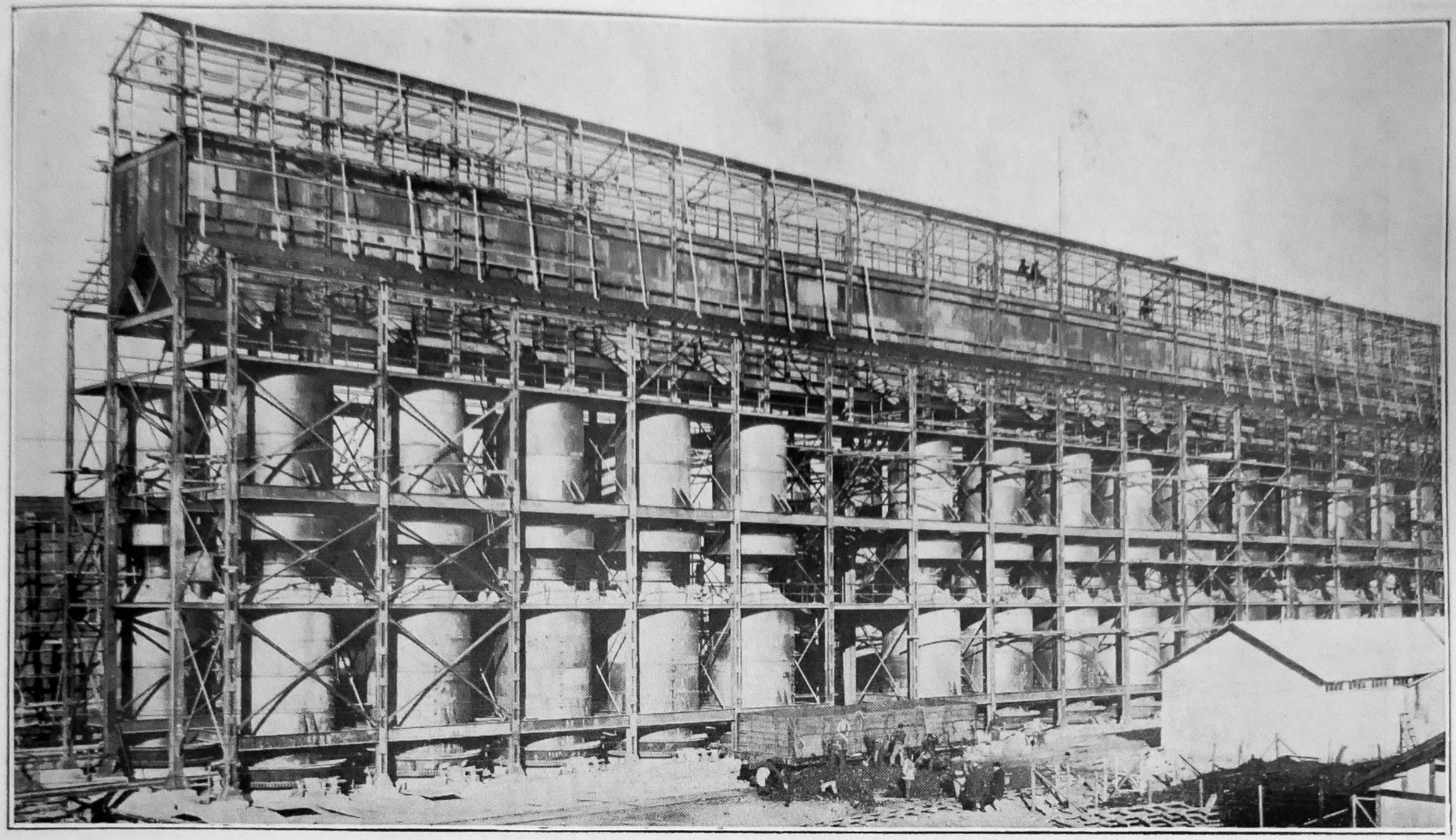


50,000 Tons Shale-Oil Plant Under Erection at the Fushun Collieries, Showing Progress to December, 1928. Top:—Boiler House and Reinforced Concrete Chimney with Elevated Water Tank Built in. Bottom:—Battery of Eighty 50 Ton Retorts

In addition, about 25 pounds of sulphate of ammonia was recovered from a ton of shale. Only when the inventors had become fully satisfied of the accuracy of their formulae and had them passed upon and approved by the highest fuel experts of Japan, did they set about designing a plant for commercial working. Nothing was left to chance. Every stage of the process was carefully checked and gone over in practice many times before it was finally adopted and the scheme laid before the Ministry of Finance in Japan for approval. Official sanction for starting the industry was given by the Central Government in May of last year.

The plans as finally approved, call for the installation of a battery of eighty 50 ton retorts, treating 4,000 tons of shale per day, or, 1,250,000 tons per year of 300 working days. These retorts and the steel frame work supporting them have been furnished by the Kawasaki Dockyard of Kobe, Japan, and are being erected from the retorts will also be conveyed to a special storage bin and loaded into cars for transportation to the mining shafts for sand-flushing purposes. From the crusher bin, the ¾ inch shale stones till be elevated to the top of the retorts discharging into an overhead conveyor that distributes and feeds the shale to the battery.

The heavy oil recovered from cooling the gas generated in the retorts, will be carried to a distillation plant. The equipment for this process, as well as for refining the paraffine and crystallizing has been purchased in Czecho Slovakia at a cost of Y.1,000,000. The eighty retorts are divided into batteries of 20 units each battery having its own blower-house and blower equipment. The spent shale will be discharged automatically from the bottom of the retorts into a conveyor running through an underground concrete compartment. From this, the shale is delivered to another underground conveyor discharging into the spent shale bins.



Front View of Battery of Retorts of the Shale Oil Distillation Plant at Fushun

The 1,250,000 tons of shale treated annually is calculated to produce the following : 50,000 tons of crude oil ; 5,000 tons of coke ; 10,000 tons of crude paraffine ; 18,000 tons of sulphate of ammonia.

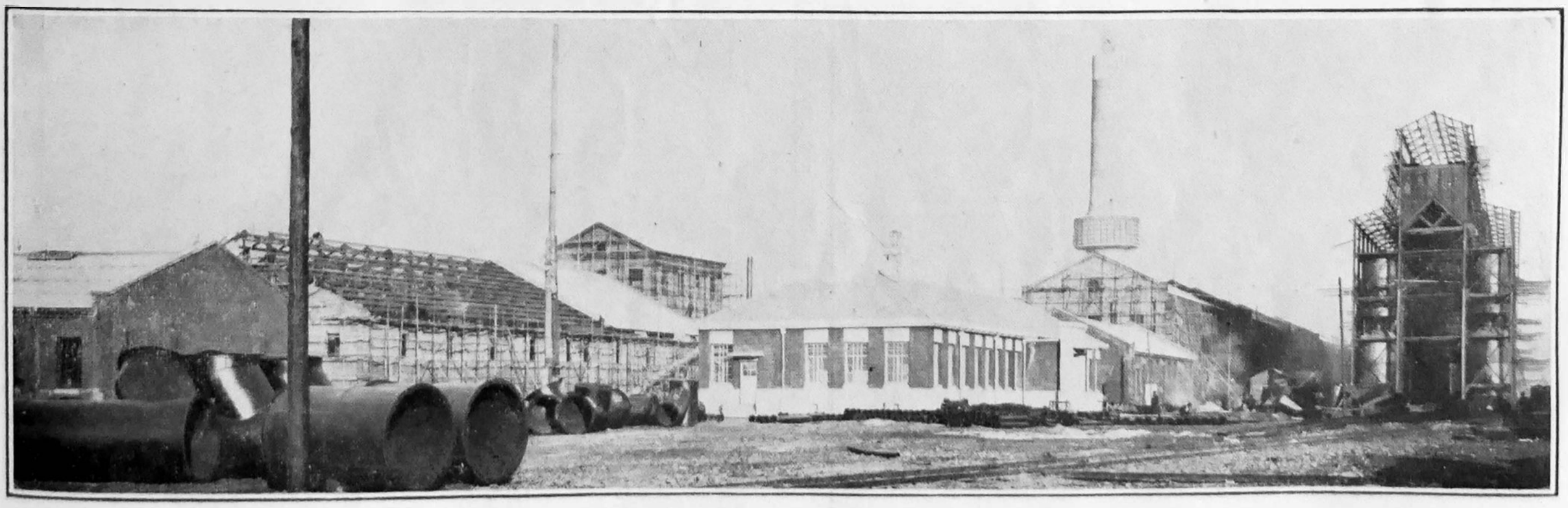
The total cost of the plant is placed at Y.10,000,000, divided as follows :—

80-50 ton retorts, including steel framework, sulphate of ammonium recovery plant, tanks and weighing machine	Y.5,000,000
Crude Oil Distillation Plant, including Paraffine recovery equipment	1,200,000
Boiler Room and Chimney	1,000,000
Crushing Plant, Railway Tracks, Cars, etc ..	1,100,000
Hoisting and Conveying System	250,000
Miscellaneous	1,450,000

The work is being rapidly pushed ahead in order to start production in October or November of the present year. As shown in the accompanying illustrations, the erection of the battery of retorts is well under way ; all the foundations have been completed and the buildings and chimney erected. Considerable mechanical equipment is already on the ground ready for installation.

There have been many estimates made of the total volume of oil shale overlaying the Fushun coal deposits as well as exhaustive analysis of the oil content and recoverable commercial products. The main coal seam, extending for nearly ten miles, is covered by a strata of oil-bearing shale averaging about 400 feet in thickness. The total oil shale reserve is placed at over 5,000,000,000 tons. The oil content varies according to the depth of the shale from the top. The topmost seam is of the highest quality, the deepest seam next to the coal, being the poorest. The oil content varies from 1 to 14 per cent., the average being 5-6 per cent. If the lower or coal strata of shale be eliminated, the average oil content is 7-8 per cent. There are many localities where the shale if mined exclusively at that point, will yield 10 per cent. and a handsome profit to the new undertaking. However, the object of the S.M.R. is to mine and market the Fushun Coal ; the oil shale enterprise being secondary to its main business.

Before reaching the shale strata, there is an overburden of surface soil and sand of 30 to 40 feet in thickness which has to be stripped by excavators, carted away and dumped at convenient locations. The development of the Open Cut Mining program

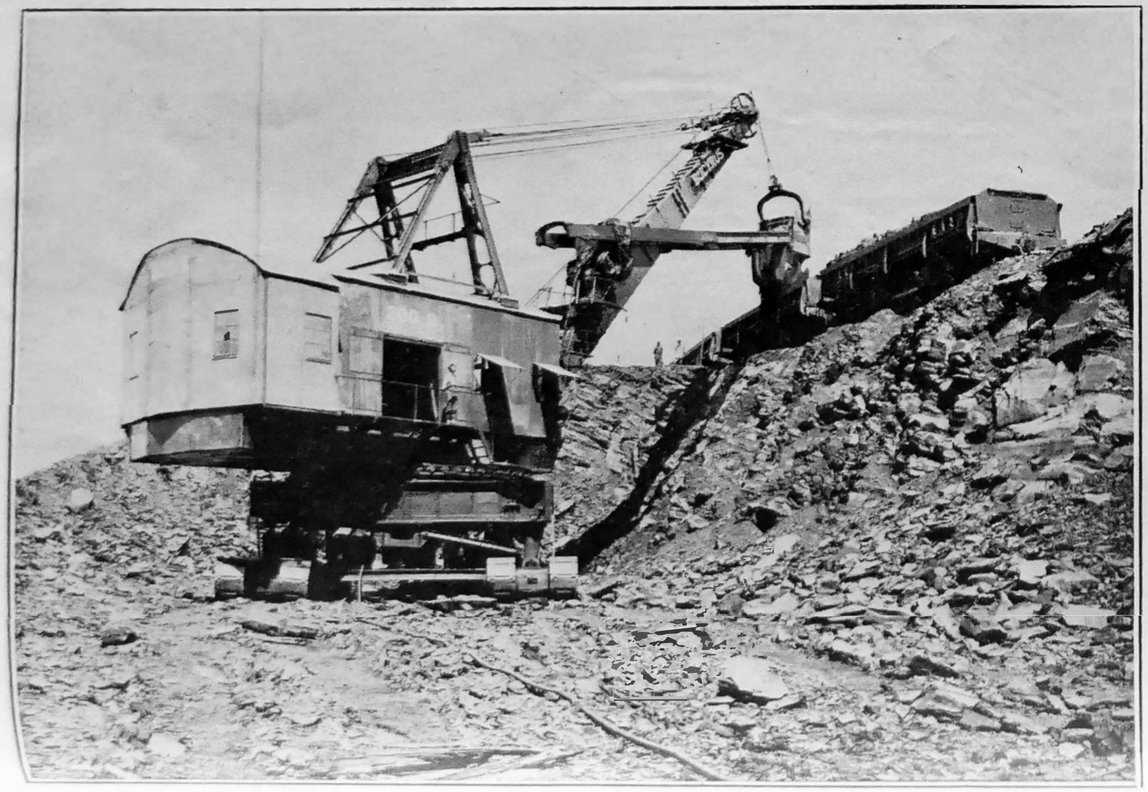


General View of Fushun Shale Oil Plant Under Erection, December, 1928

AMERICAN ELECTRIC SHOVELS IN OPERATION AT FUSHUN

2 Cubic Yard Bucyrus-Erie Electric Shovel Loading Coal at Fushun

Heavy Duty Bucyrus-Erie, 4 Cubic Yard Electric Shovel Digging Shale at Fushun



6 Cubic Yard Bucyrus-Erie Electric Shovel Digging Shale at Fushun

Class 50 Bucyrus-Erie Spreader used for Spreading at the Spoil Bank, Fushun

necessitates the removal of the shale strata, the disposal of which is a serious problem unless it can be treated for its chemical properties. Consequently, the main mining operations will not permit of concentrating upon the richer shale for oil recovery. The shale must be treated as it comes from the excavation without selection for quality. For this reason, taking the average run of the shale, the estimates for recovery at the new shale oil plant is based on a four per cent. oil content in the shale with a 97 per cent. extraction; a safe and conservative estimate. The new enterprise bases its hopes of commercial success, not so much on the proceeds of its crude oil recovery as from the other by-products. A ton of shale with an average 8 per cent. oil content is estimated to give the following yield in by-products :—

Gasolene 1.50 gallons; Lighting Oil 4.22 gallons; Votatile and Fine Oil 5.58 gallons; Lubricating Oil 1.54 gallons; Paraffine 20 pounds; Sulphate of Ammonia 40 pounds.

The above figures must be reduced one half in order to tally with the production estimates on a four per cent. basis of heavy oil recovery. The entire output of oil products from the Fushun plant is to be purchased by the Japanese Navy Department at a stipulated price and delivered to the Navy Fuel Depôt at Tokuyama, Japan.

In addition to the by-products listed above, lysol of a high quality has also been recovered from the tar residue. Other important chemicals and disinfectants have been extracted by the S.M.R. Central Laboratory experts and although these products do not figure prominently in the present working estimates, it is hoped that in time their recovery can be made commercially feasible in order to liberate Japan from her present dependence upon foreign importations of disinfectants.

The total oil shale reserves in the Fushun Mining Zone is estimated at 5,000,000,000 tons. Based on a four per cent. extraction, these reserves would theoretically yield 200,000,000 tons of crude oil and other by products. The excavation, however, must be confined to the Open Cut Workings and the commercial oil shale limited to the actual quantities excavated according to the program laid down for development over a period of 20 to 30 years. Mr. L. P. Davenport, the American Consulting Engineer engaged by the S.M.R. to report on the Open Cut Workings and lay out a program of development, estimates the total quantity of shale to be excavated between 1923 and 1942 at 50,000,000 cubic meters, the average yearly quantity from 1927 to 1942 being 3,200,000 cubic meters or, about 5,600,000 tons. Another estimate submitted by Mr. T. Umuna, Superintendent of the Open Cut Workings, gives a total shale excavation of 80,000,000 cubic yards, or 120,000,000 cubic tons in the 20 years from 1926 to 1945, a rough average of 6,000,000 tons per year. Mr. Davenport's estimates are based on mining 3,000,000 tons of clean coal per year from the Open Cut Workings. In 1927, the output from these workings was 2,448,000 tons, so it is fair to estimate that the annual commercial shale output for the next twenty years will not exceed 6,000,000 tons or sufficient to provide 240,000 tons of crude oil per year, in addition to the other by-products recoverable.

Although we understand that all the shale excavated would be treated for oil recovery, it is quite possible that this program may be modified to the extent of discarding as commercially valuable the shale strata for 100 feet above the top of the coal seam and concentrating upon the richer stratas. In Mr. Davenport's estimates for mining the oil shale he disregarded the lower 100 feet as suitable for retorting. An idea may be formed of the percentages of oil in the shale stratas from the accompanying chart of three typical borings analyzed at the S.M.R. Central Laboratory at Dairen. In the event that operations are confined to the top and center shale stratas, an average 8 per cent. recovery is possible, thus doubling the output of oil and by-products but lowering the quantity of available commercial shale by about one third and necessitating its dumping at some convenient location. This would lower the quantity of commercial shale mined per annum to about 4,000,000 tons. Assuming an eight per cent. average oil content, this would permit the recovery of nearly 320,000 tons of crude oil. A recent report of the S.M.R. gives the total amount of coal that can be profitably excavated from the Open Cut Workings at 200,000,000 tons. The excavation program laid down for the development of these workings being 3,000,000 tons of coal per year, the time limit of profitable working of the oil shale is therefore approximately 67 years from date. If all the shale is retorted and four per cent. crude oil extracted, the total oil recovery would be approximately 16,000,000 tons. If the lower strata of poor shale be left out of the calculation, the total oil recovered in 67 years would be about 21,440,000 tons, or, one tenth of the oil in the total shale reserves.

The Japanese demand for crude oil and kerosene is about 2,500,000 tons per year of which only 500,000 tons is supplied by the home oil wells. Japanese writers have stressed the fact that the Fushun shale deposits can supply to oil requirements of Japan for the next 300 years, but this dream can only be realized by utilizing the entire five billion tons of shale with an oil recovery of 6-7 per cent. It is impossible that as time passes and the Japanese experts make further investigations and experiments, that some economical method of excavating the shale and recovering the oil and by-products as a purely independent commercial proposition, will be devised, but for the present it is unnecessary to go outside the actual yearly estimated quantities of shale excavated in order to uncover the coal seam underneath. It goes without saying that the Japanese with their characteristic enterprise, will increase the capacity of the present 1,250,000 ton plant if it proves profitable, and as they have worked everything out carefully beforehand, this seems to be assured. In this event, the capacity of the plant at Fushun will be increased to handle the entire volume of shale excavated annually, or 6,000,000 tons, producing 240,000 tons of crude oil. This expansion will call for the further investment of at least Y.50,000,000 in new plant and machinery.

The thoroughness with which the Japanese are taking up this proposition is seen in the resolution of the S.M.R. to erect a paraffine refinery in Japan. Paraffine having a melting point of 45 degrees or over is subjected in Japan to an import duty of Y.200 per ton; under 45 degrees it enters free. The Fushun by-product has a melting point of 55 degrees, which, if sold in Japan would pay a duty of Y.2,000,000. In order to save this duty, the S.M.R. will erect a paraffine refinery at Osaka at a cost of Y.1,500,000. The crude paraffine as it is recovered at Fushun will be mixed with oil to lower its melting point to 45 degrees so the product can enter Japan free of duty. Here it will be refined and manufactured into candles and other marketable products. The site at Osaka for the new refinery has already been acquired and erection of the plant will be started in April in order that it will be ready for operation in October when the new Fushun Oil Shale plant is scheduled to begin operations.

Book Notes

China and Russia

Russo-Chinese Diplomacy by Ken Shen Weigh, PH. D.; "Commercial Press," Shanghai.

Dr. Weigh's book must be divided into two parts: the first seven chapters are important, scholarly, erudite; Chapter VIII is unmitigated blah, written apparently at the last moment and interpolated in an otherwise excellent volume. It is unfortunate that Dr. Weigh permitted himself to be misled from scholarship to propaganda, from fact to apology. Perhaps Dr. Weigh, now that he has seen his work in print, will ask the Commercial Press to omit Chapter VIII from future editions. Then he might write another book, as ably as this was done, on Russia's relations with the Kuomintang from 1924 to 1927. The unfortunate impression of Chapter VIII, however, is lessened by his Preface, which is more in harmony with the tone of the remainder of the book.

The fact must be noted, however, that here is a book published in 1928 on the relations between China and Russia in which the name of Borodin never appears!

The story of Russia's effort to conquer China by military force, by political intrigue, by peaceful penetration, by railway agreements and by Communist propaganda has been continuous from the days of Muravev-Amursky to the present days. The shameless participation of Franco-Belgian finance almost achieved the partition of China. This story, from varying standpoints, is told in Paul Hibbert Clyde's "International Rivalries in Manchuria (1689-1922), in Philip Joseph's "Foreign Diplomacy in China (1894-1900) and in George Bronson Rea's "Hoover in China" in the *Far Eastern Review*.

Dr. Weigh's book is a Chinese contribution to this subject and he does his job well, except that one would have enjoyed more evidence from purely Chinese sources, which may now be available to Dr. Weigh, who is connected with the Ministry of Foreign Affairs.

(*Continued on page 79*)

turbine made by Westinghouse Electric and Manufacturing Company and two 500 k.v.a., 3,300 volt, 50 cycle, 375 r.p.m. alternators manufactured by the Shakako Works, directly connected to 600 h.p. Bellies engines. There are three Babcock and Wilcox boilers.

The territory has 8,648 consumers with a total of 49,969 lamps. The consumption for power purposes is 2,967,960 k.w.h. half yearly.

The Lienshankuan Power Station

This plant is the smallest operated by this Company. There are two 50 k.v.a., 2,200 volt, 60 cycle, 900 r.p.m. alternating current generators made by the Okumura Electric Manufacturing Co. These are coupled with a 70 h.p. semi-Diesel engine manufactured by Pater & Co. England. The two exciters with 2 k.w. capacity each were supplied by the Okumura Electric Manufacturing Co. In Lienshankuan and its neighboring districts, only 261 consumers are served. The total number of lamps is 703, and 25,100 k.w.h. of electricity is consumed for power purposes.

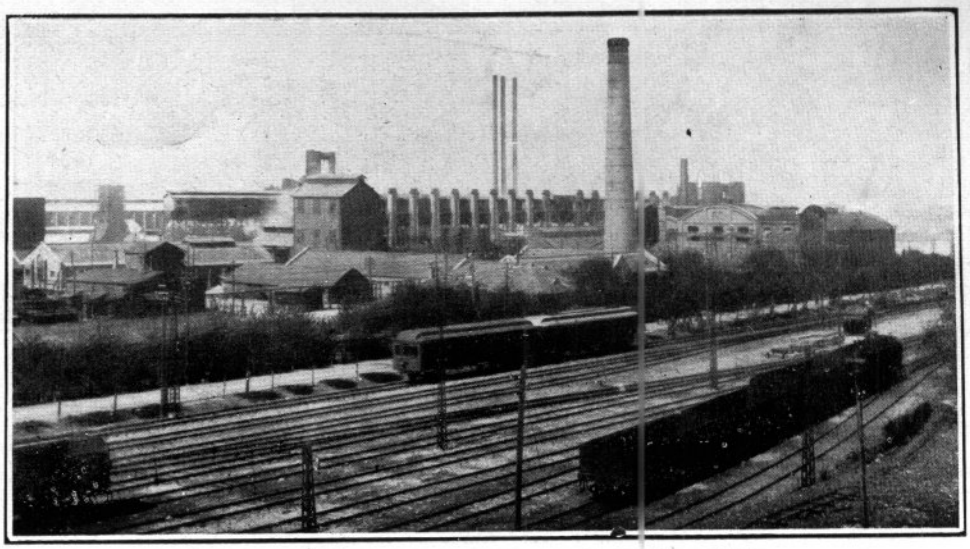
At present, the Company has 9 sub-stations which are interconnected and provided with protective and safety devices to insure safety to apparatus and continuity of operation.

Sub-Stations

The following is the list of sub-stations operated by this Company:

Sub-stations	Installation	Operating transformer capacity k.v.a.	Makers
Jinjaura	Single phase, outdoor	4,500	Shibaura
Shikishima-hiroba	ditto, indoor	6,000	Yasukawa
Dafangshen	ditto, outdoor	450	Mitsubishi
Choushuitze	ditto, ditto	120	Fusi E.Mfg.Co.
Moukden	ditto, indoor	6,000	Mitsubishi and Osaka Dento
Fushun	ditto, ditto,	9,000	Yasukawa
Liaoyang	Three phase, outdoor	3,750	ditto
Yentai (nr. R. Station)	Single, ditto	765	Mitsubishi
ditto (nr. Colliery)	ditto ditto	750	ditto

Total length of aerial transmission lines owned by the Company is approximately 175 miles. Wooden poles are exclusively used for 3,300 and 11,000 volt lines, while for 44,000 volts, steel towers and poles are used. The Company's distribution system consists of about 522 miles of aerial lines, 24, 205 poles and 2,878 pole transformers.



Exterior of No. 1 Power House at the Fushun Colliery

Electric Tramways

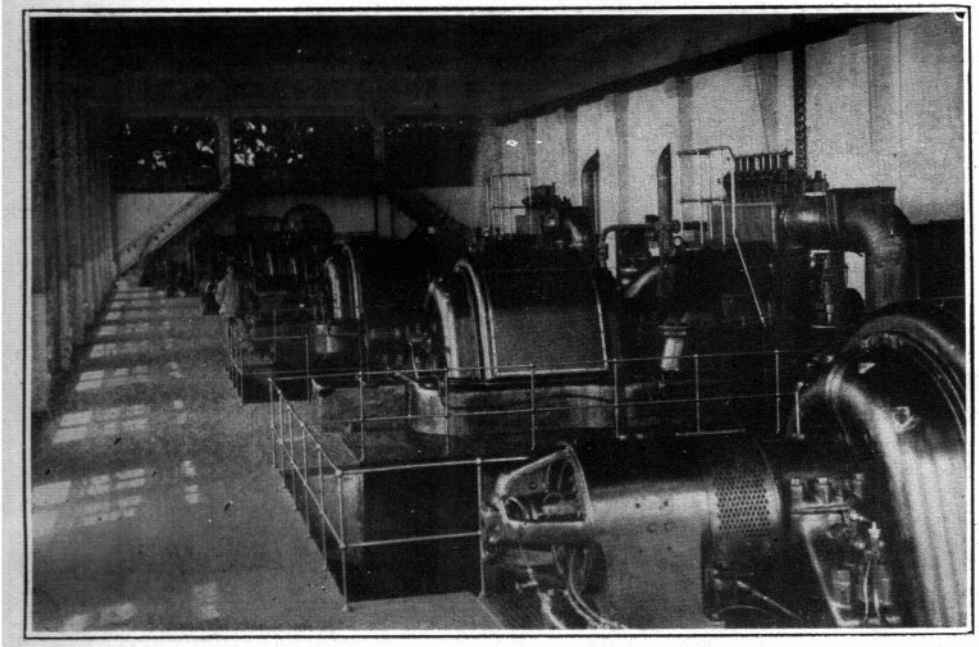
The electric tramway system in Dairen and its suburbs are also operated by the South Manchuria Electric Company. At present, the Company has 100 cars including single and Bogie type, 9 freight cars and 2 watersprinkling cars. There are 33,198 kilo meters of track, of which 4,898.5 meters are single and 28,299.5 double. In addition, there are 3,112 meters of track used as sidings. The number of passengers carried in the year ending June, 1928 was 24,729,004 with revenues of Y. 1,061,839.00

Motor Bus Transportation

Mention may also be made of the motor business operated by the Company. Formerly three services were operated, namely, Ryojun (Port Arthur), Shuishiying and the Ryojun-Dairen line. A service in the City of Dairen was opened at the beginning of April last. At present, the Company operates 28 motor buses including 5 International (each with an accommodation for 20 passengers) and 10 Chevrolet (each with an accommodation of 24 passengers).

Affiliated Companies

In South Manchuria there are 9 electric companies affiliated with and managed by the South Manchuria Electric Co., Ltd. These plants were all erected by the S.M.R. and operated by its electrical department up to 1925, when independent companies were organized to take them over. Although the S.M.R. holds a controlling interest, the other shares are largely in the hands of Chinese.



Generating Room of No. 1 Power House at the Fushun Colliery

Name of Company	Amount of Paid up Capital
Wafangtien Electric Light Co. Ltd.	Y.37,500
Tashihchiao Electric Light Co. Ltd.	37,500
Liaoyang Electric Light Co. Ltd.	200,000
Tiehling Electric Bureau	150,000
Manchuria Electric Co. Ltd.	237,000
Ssupingkai Electric Light Co. Ltd.	125,000
Kungchuling Electric Light Co. Ltd.	100,000
Fanchiatun Electric Co. Ltd.	25,000
Liaoyuen Huashing Electric Co. Ltd.	133,600

With these various undertakings under its management, the South Manchuria Electric Co. Ltd. is showing good results. The gross income of the Company in the latter part of 1927 was Y. 4.125,536.21 and gross expenditure, Y. 3,263,-777.26, leaving a balance of Y. 861,758.54 as profit for the half year.

The above mentioned affiliated companies are also doing well. The Liaoyang Electric Light Company has never distributed less than ten per cent in dividends and at present has a reserve fund and other properties considerably in excess

General View of Kanchingtzu, Showing Shore End of Breakwater and Temporary Construction Wharf, September, 1928

South Manchuria Railway New Coal Port

Mechanical Loading Pier, Equipped to Handle 5,000,000 tons of Coal Annually, Under Construction at Kanchingtzu, Across the Bay from Dairen

ONE of the most interesting engineering developments now under way in Manchuria is the construction by the South Manchuria Railway Company of a new coal storage yard and loading wharf at Kanchingtzu, across the bay from Dairen. This new enterprise is a natural corollary to the steady increase in the output of Fushun coal and the necessity for up-to-date mechanical loading devices to facilitate its export at some central location. The output of Fushun coal for the present fiscal year is estimated to reach 8,100,000 tons. The output in 1927 was 6,715,400 tons. The sales for the same year show a total of 6,836,151 tons, of which, 1,643,373 was sold in Manchuria, 1,117,670 tons were used by the S.M.R., 3,371,982 tons were exported and 703,125 tons delivered to steamship bunkers. Although a small percentage of the exports and bunker coal goes through Antung, Newchwang and Port Arthur, the main volume passes through the port of Dairen. The total volume of coal shipped over the S.M.R. to Dairen for the fiscal year ending March 31, 1928, was 4,194,222 tons, of which 2,900,000 tons were exported. The total volume of import and export cargo passing through the port of Dairen for 1927 was 8,200,000 tons, of which 3,500,000 tons, or 42 per cent. represented coal exports and bunkering supplies.

This large percentage of the total volume of cargo passing through the port has taxed its capacity to the point, where, unless another outlet is found, the coal shipments will press heavily on the limited area and facilities required for storing and handling other cargo. The facilities of the port enable coal to be supplied to steamers either by coolie or mechanical power. Loading by hand can be performed at the rate of 1,200 tons per day, which, for the five coal berthing spaces, gives a total loading capacity of 6,000 tons per day. A special experimental coal wharf was built and placed in operation in June 1926. This is operated on the car-dumper system, the loading being carried out by a belt conveyer and travelling loader, delivering about 4,000 tons of coal per day into the steamers. In addition, the Port of Dairen operates three Mitchner lighters of 500 tons capacity each, having a loading capacity of 100 tons of bunker coal per hour.

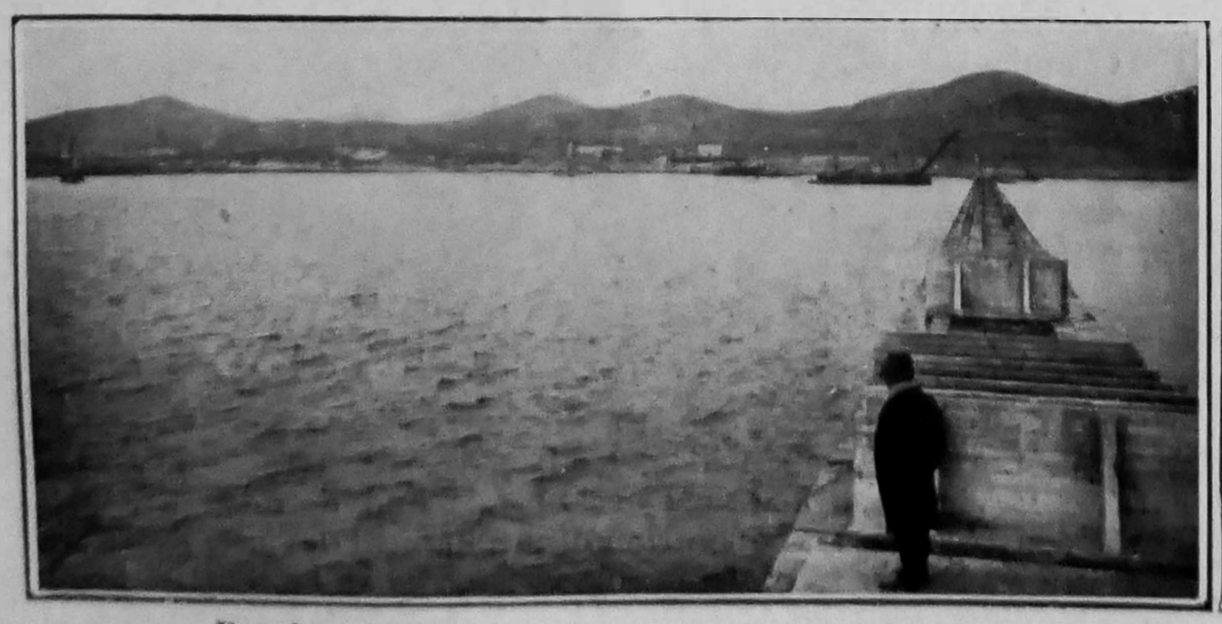
In order to concentrate all the coal handling of the port at one point and relieve the strain on the docks and storage space required to take care of the increasing annual volume of beans and other cargo, the S.M.R. purchased a location across the bay from Dairen for the laying out of a new coal storage yard and the construction of a mechanical loading wharf. The first stage of the constuction program is now well under way. The plans provide for a storage yard and loading wharf with a capacity for handling 3,000,000 tons of coal per year, with an extension program that will increase this amount to 5,000,000 tons.

The first stage of the program is to be completed by the end of 1930, at a cost of Y.8,000,000, itemized as follows;

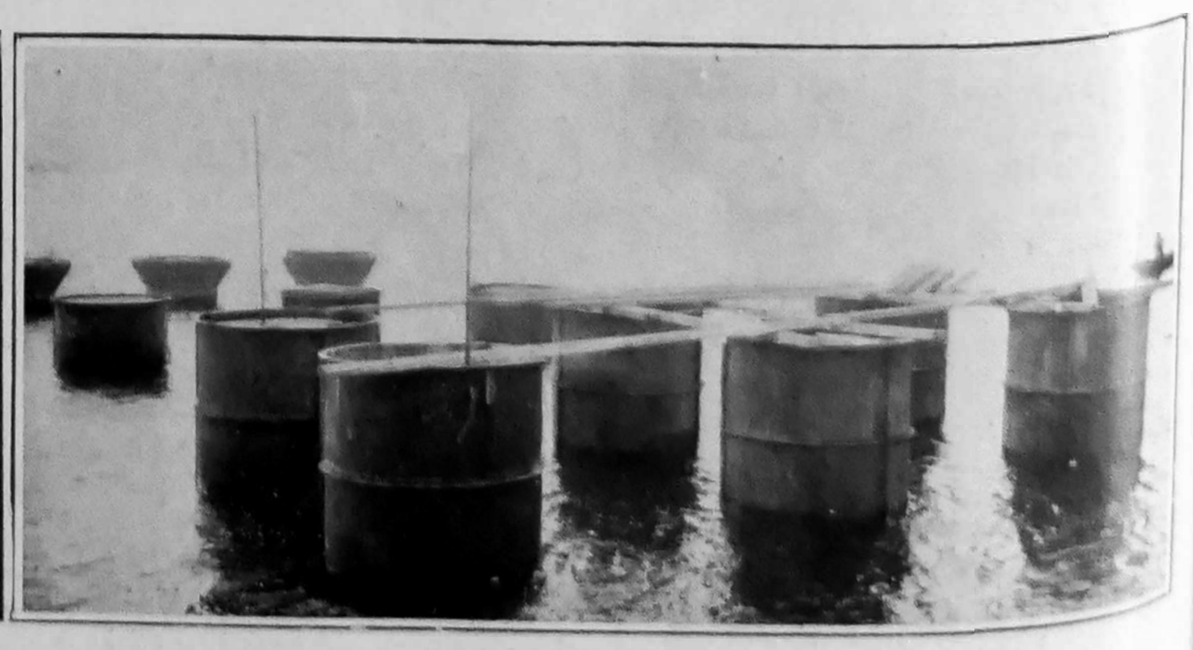
1.	Breakwater parallel to the Main Pier, 700 meters long	Y.1,000,000
2.	Elevated Railway and Wharf	1,600,000
3.	Filling and Reclamation	300,000
4.	Mechanical Equipment; Weigh Bridge, Car Dumper, Bridge Transporters, Pier Cars, etc. ..	2,000,000
5.	Electrical Equipment	300,000
6.	Buildings and Land	100,000
7.	Water Supply Boat	80,000
8.	Railway Tracks	2,200,000
9.	Storage Yard	300,000
10.	Miscellaneous	120,000
	Total	Y.8,000,000

All coal shipments from Fushun will be switched off the main S.M.R. line at Paotzuai, (a little north of Choushuitzu) to a new branch line nine kilometers long, connecting with the coal port at Kanchingtzu. There will be two storage yards laid out near the pier. The main yard will have storage capacity of 350,000 tons, while nearer the pier will be located a smaller yard for storing 100,000 in cars ready for immediate delivery to the pier coal dumper. The main storage yards will be provided with two bridge grab transporters and loaders handling 300 tons per hour each.

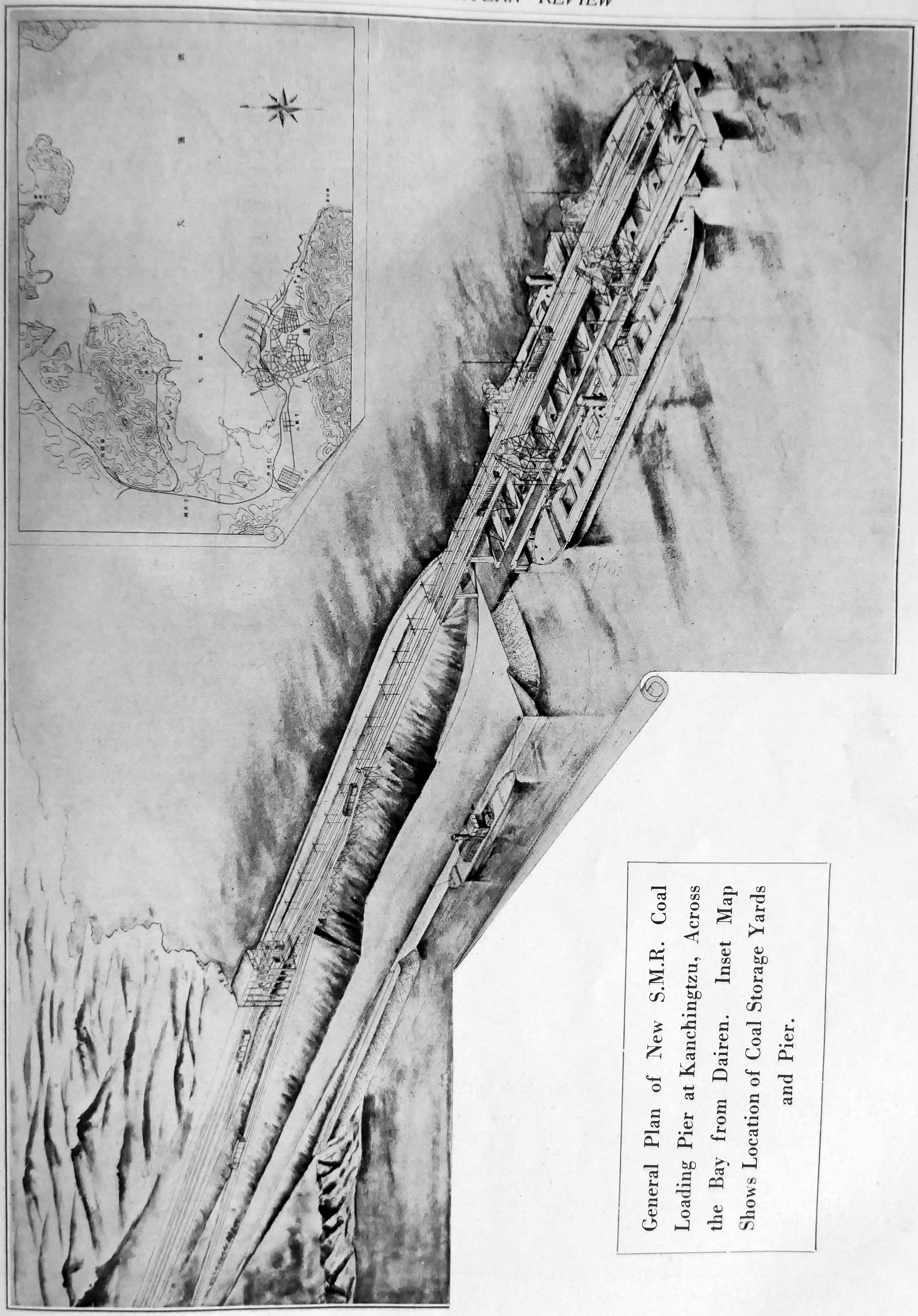
The whole system of railway transportation on the nine kilometer branch line, shunting and mechanical handling, will be operated by electricity, the current being supplied by the S.M. Electricity Company's Amanogawa Power Plant at Dairen at a pressure of



Breakwater at Kanchingtzu, November 10, 1928



Caissons for Coal Pier



General Plan of New S.M.R. Coal Loading Pier at Kanchingtzu, Across the Bay from Dairen. Inset Map Shows Location of Coal Storage Yards and Pier.

11,000 volts. A sub-station of 1,500 k.w. capacity will be located near the pier and at least five electric locomotives of the Fushun type will form part of the transportation equipment.

From the storage yards, the coal will be transported by electric power to a 100 ton weigh-bridge which automatically weighs and records the weight of the cars while in motion. The S.M.R. has now in operation over 200 steel coal cars of 60 tons capacity made at their Shakako Shops and by the Dairen Engineering Works. The Railway Company intends to replace all of their old 30 and 50 ton cars with the 60 ton type in order to run longer and heavier trains. From the weigh-bridge, the individual coal cars will be pushed up the incline to the car dumper by an electric mule operated on an endless wire rope arrangement. The coal dumper is designed to handle any size car at a rate of thirty 300 ton cars per hour, or 900 tons. The coal is then dumped into electrically operated pier cars, of which there are five of 65 tons capacity each, which carry the coal out to pier itself, discharging into the hoppers of the pier transporters and loaders and returning to the car dumper for another load.

The pier has a total length of 425 meters, but the actual coal loading end is only 175 meters long with a depth of water alongside of 10 meters. The pier floor is 19 meters above the low water level. The lower pier, 34 meters wide consists of the concrete footings and foundation supporting the upper steel or working pier (17.6 meters wide,) carrying the railway tracks for the pier cars.

The loading machines, as shown in the illustration and plans are equipped with hoppers, bucket conveyors, telescope chute, mechanical trimmer and anti-breaker. The entire mechanical equipment consisting of the special bridge work, car dumper, pier transporters and loader, pier cars etc. were designed and upplies by the Wellman, Seaver, Morgan Company of America.

The above plant and equipment, designed to handle 3,000,000 tons of coal per year, constitues the first stage of the program. On its completion, extensions will be made that will raise the capacity of the pier to 4,800,000 tons per year at an extra cost of Y.2,700,000. When fully completed in 1933, the initial breakwater, 700 meters long will be extended 150 meters and the pier itself lengthened from 175 to 300 meters, providing berthing for four steamships. Another weigh bridge, car dumper, an extra pier car and two more transporter loaders will be added to increase the daily handling capacity to 16,200 tons or 4,860,000 tons per year. An extra grab transporter at the storage yard will also be added. The entire plant when completed will cost Y.11,000,000.

The lack of water at the pier compels the use of water boats to supply the steamers until such time as mains can be laid to connect with the Dairen water supply system, a distance of 18 kilometers. When these mains are laid and a proper water supply assured, it is the intention of the S.M.R. Company to lay out a small town near the coal wharf for the convenience of the workers and the ships which utilize its facilities.

In addition to the Kanchingtzu Coal Pier described above, the S.M.R. is constructing a coal pier at Newchwang that will be ready by July of this year. This pier will be capable of handling 600,000 tons a year. The Port Arthur jetties are having two new berths added for coaling purposes raising the capacity of that port to about 800,000 tons annually. When all these works are completed, the S.M.R. will have loading facilities at its three deep-water terminals, enabling it to export 6,400,000 tons of coal per year. Contrary to the prevailing opinion in China, that Japan is relying upon Fushun Coal for its own industrial needs it is interesting to note that out of a total output of 8,700,000 tons estimated for the current year, only 1,950,000 tons are destined for Japan, or, about half the total exports and bunkers. The import of coal into Japan is regulated by the Coal Dealer's Federation who prevailed upon the S.M.R. to reduce its exports to the home country so as not to create a surplus in the market that would lower prices. Consequently, the S.M.R. is expanding its export markets for Fushun Coal in other Far Eastern countries.

British Columbia Red Cedar for Japan

MAKING the name and fame of British Columbia red cedar famous in Japan in particular, and the Orient in general, has been the task of the Capilano Timber Co., Ltd., for nearly a decade past, and in that time the firm has been rewarded by a gratifying increase in its business, especially in Japan. In fact, the firm's timber export business to that country in which it was the pioneer, has grown to such proportions that five different Vancouver lumber firms are now engaged in the task of supplying the Japanese market.

Through it all, the Capilano Timber Co. has more than held its own by adherence to its policy of shipping nothing but the highest quality of British Columbia red cedar to the Japanese market. As a result this sterling wood is very popular in Japan, which takes large quantities of it—both in logs as well as the familiar "Japan squares," which the mills in the Orient cut up to suit their local market. The Japanese buyer is very particular about the quality of the logs which he buys for consumption in Japan, and with one of the finest stands of red cedar on the Continent to draw from, the company is able to meet the most exacting specifications as to size and quality in its shipments to the Japanese market.

The splendid stand of red cedar, which this company possesses on the upper reaches of the Capilano valley, as well as its railway system and the strategic location of its mill on the north shore, all represent keen and far-sighted investments that date back to the early days of the city's history.

In some respects the location of the Capilano Timber Co.'s mill, facing as it does Vancouver, Canada's third largest city—within 35 miles of logging line running from the mill right into the heart of its timber limits, and excellent tidewater shipping facilities right from its mill, as well as rail connection shortly to four trans-continental lines, all give this progressive concern certain advantages which few timber firms now possess so close to civilization.

Hygienic Logging Camps

Operating as they do through a portion of the Greater Vancouver water board's territory in the Capilano valley, all logging operations there are conducted under the strictest hygienic regulations of the provincial health department in order to avoid any possible contamination of the water supply. In the carrying out of these regulations, the company and its staff are co-operating whole-heartedly with the provincial health department.

The mill has a daily output of approximately 150,000 ft. per day, while the modernly equipped shingle mill adjoining can also produce up to 600,000, or approximately three carloads, of the finest red cedar shingles daily. These latter are marketed under the trade outname of "Edgwood" as part of the product of the Consolidated Shingle Mills of British Columbia Ltd. Handling such large quantities of red cedar, the company is able, by operating its own saw and shingle mills in close proximity, to get the utmost possible out of the log, reduce economic waste to the minimum and at the same time keep their product in both lines of the very highest quality, which the export trade demands.

For certain uses, which are being found more extensive every year, the red cedar grown in British Columbia is conceded to be in a class by itself. Its straight grain, easy working qualities, its value for lining clothes closets and protecting the contents from moths as well as its beautiful finish when used in the natural state, all combine to make this wood in great demand by leading wood-using industries all over Canada and the United States.

Selecting the Right Logs

In order to improve its export facilities and allow cut logs to be loaded direct on steamers for the Japanese and other export markets, the Capilano Timber Co. recently drove dolphins and mooring piles in deep water just outside its mill and booming ground. This has proved a great facility to the export trade, and half-a-dozen large steamers have loaded in this way of late. The logs are picked up right out of the water by the vessel's winches and stowed to the best advantage, it being possible to select from the large number of logs right at hand in the booming ground just the particular sizes needed to stow to with all possible saving of space. With these improved facilities, the company is looking forward to a still greater expansion shortly in its export business, not only to Japan, but to other parts of the globe.

Japan's Iron and Steel Industry, 2

Coal and Coke

By J. H. Ehlers, Assistant Commercial Attaché, Tokyo

PERHAPS the most important factor in the Japanese iron industry is that of obtaining adequate supplies of satisfactory coke at reasonable prices. Japan has an abundance of coal for the maintenance of its present industrial state in general, including supplies of coking coal sufficient for the present iron industry. With respect to producing a satisfactory quality of coke for iron smelting, however, Japan's coals possess many defects. The total coal reserves of Japan are estimated at somewhat over 9,000,000,000 tons.

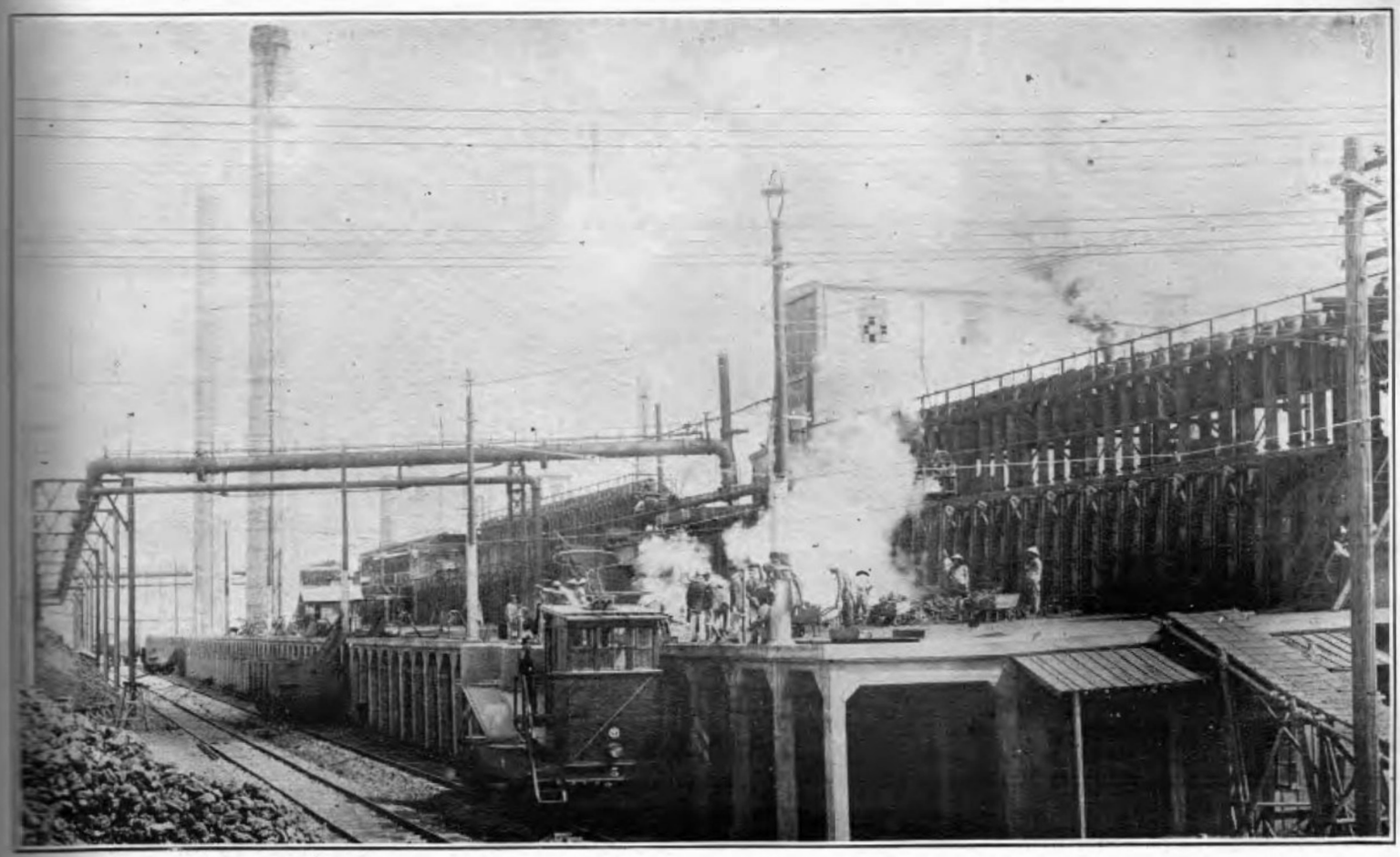
The following table shows these reserves as actually determined and as estimated :

COAL RESERVES OF JAPAN, CHOSEN, AND MANCHURIA

[In millions of metric tons]

Districts	Actually determined				Probable			
	Anthracite	Bituminous	Lignite		Anthracite	Bituminous	Lignite	Total
Karafuto	—	17	—		—	1,345	—	1,362
Hokkaido	—	336	—		—	2,106	233	2,675
Kyushu	—	542	—		—	2,374	—	2,916
Other	5	1	67		57	409	478	1,017
Japan total ..	5	896	67		57	6,234	711	7,970
Chosen	7	1	5		33	13	22	81
Manchuria ..	—	409	—		68	731	—	1,208
Grand total ..	12	1,306	72		158	6,978	733	9,259

The foregoing table was compiled by K. Inoue, of the Imperial Geological Survey and was taken from an article on the iron and steel industry of Japan by Dr. Ing. E. Kothny. The northerly island of Karafuto (also known as Sakhalin) is considered rich in coal deposits, although it has not been fully prospected. The northern, or Russian half of this island contains large quantities of coal, and many of the mines there are being worked by Japanese interests under concessions.



Coke Ovens, Aushan Iron and Steel Works, Manchuria

The total production of coal in Japan is now in excess of 30,000,000 tons annually, with exports and imports each in the neighborhood of 2,000,000 tons. Prior to 1922 the exports exceeded 2,000,000 tons, while the imports were about 750,000 tons. Since 1921, however, the exports have declined somewhat, while imports have greatly increased.

The production, exports, and imports of coal are shown as follows :

JAPANESE COAL PRODUCTION AND TRADE

[In thousands of metric tons]

Year	Production	Exports	Imports
1917	27,287	2,791	707
1918	29,124	2,180	762
1919	32,713	2,001	700
1920	30,828	2,130	797
1921	27,676	2,388	777
1922	29,481	1,691	1,169
1923	30,941	1,574	1,686
1924	32,213	1,711	1,980
1925	31,450	2,700	1,741
1926	31,485	2,590	2,013
1927	33,400	2,173	2,661

Engineering Notes

ELECTRIC LIGHT, POWER AND TRACTION

ELECTRICITY EXTENSION IN HONGKONG.—The interesting announcement was made at the annual general meeting of the China Light and Power Co., Ltd., that the Company is on the eve of closing an agreement with the Government for the supply of electricity to the New Territories, Hongkong, which it is hoped will, in course of time, prove a profitable source of revenue.

HANSHIN SUBWAY PLAN APPROVED.—The Osaka-Kobe Electric Railway Company, familiarly known as Hanshin, has a plan of building a subway from Iwaya to the new Sannomiya Government Railway station, a distance of about two miles, at an estimated cost of Y.6,000,000. This plan was formally introduced in the session of a special committee of the Kobe Municipality, was approved subject to some conditions.

ELECTRIC GLOBES.—The consumption of electric lamps in Japan has been steadily increasing every year, and at present the demand is estimated at some 50,000,000 units a year. Until the close of the Meiji Era (1912) carbon filament was most in favor, but since then tungsten has been gradually replacing carbon. The appearance of incandescent lamp gave a vital blow to vacuum lamps and the contrast is like that between carbon and tungsten more than a decade ago.

AIKOKU DENKI K.K., (Aikoku Electric Co., Ltd.)—In order to manufacture incandescent lamps invented by Dr. Eiji Aoyagi, of the Kyoto Imperial University, a new company has just been established, with a capitalization of Y.300,000, all paid in. The new company is to succeed the business of the former Nagamine Denkyu K.K. The management of the company includes: Masaji Masuda of Osaka as president, Fumio Nagamine as managing director, Hisayoshi Imamura and Kenichiro Mochizuki as directors.

NEW POWER PLANT FOR KONGOSAN RAILWAY CO.—It is reported that the hydraulic power plant of the Kongosan Electric Railway Company, under construction at Kosenri and its equipment have recently been completed and examination of them by the Communications Bureau was finished recently. It may be noted that the total power generated by the Company is over 10,850 kilowatts.

SANYO CHUO SUIDEN K.K., (Sanyo Chuo Hydro-Electric Power Co., Ltd.)—The construction of Narihagawa Power Station, capacity 12,000 k.w., was completed before the end of last year and operation was permitted on December 31. Principal equipment consists of 3 units of 5,000 k.v.a. generators made by Dengyosha and Shibaura Seisakujo, 4 units of 5,000 k.v.a. transformers, etc.

KEIHIN DENRYOKU K.K., (Keihin Electric Power Co., Ltd.)—The Yugawa Power Station of Keihin Denryoku K.K.—located on the Yugawa River, a tributary of the Sai River on the upper reaches of Shinanogawa—was completed in November last year. Power from this station—capacity 6,000 k.w.—is to be sold to Tokyo Dento K.K., together with the output from other stations 18,000 k.w. Nagawa, 2,950 k.w. Oshirakawa, and 2,100 k.w. Maekawa Stations.

WAHAGI SUIRYOKU K.K., (Yahagi Water Power Co., Ltd.)—The deferred construction of Tateishi Power Station, located in Mitsuho Mura, Shimo Ina Gun, Nagano Prefecture, has just been started. The plan was delayed due to prolonged negotiations with Mitsuho Mura for compensation constract. The capacity of this new station will be 6,000 k.w.

AOMORI DENTO K.K., (Aomori Electric Light Co., Ltd.)—The construction of Yabestu Power Station of Aomori Dento K.K. was completed in December and passed the inspection of the Department of Communications. Another plant, Kansuizawa, is completed except for a part of earthwork which is now interrupted on aecount of extreme cold.

HAKUSAN SUIRYOKU K.K., (Hakusan Water Power Co., Ltd.)—Power generated at Torigoe Power Station of the company is to be transmitted to the new Yoshinotani Substation just completed near the Yoshinotani Power Station, and from there the voltage is to be brought up to 77,000 v. to be further transmitted to Daido Denryoku's system. Yoshinotani Substation is equipped with 5,000 k.v.a. transformers and switchboards manufactured by Shibaura Enginnering Works.

INDUSTRIAL

COAL LIQUEFACTION LABORATORY.—With regard to the liquefaction of coal projected by Mr. Yutaka Noguchi of the Nihon Chisso Hiryo Kaisha (Japan Nitrogenous Manure Company) in Kanko, it is understood actual investigation is at present being made and carried on and on completion a big laboratory will be established at a cost of about 1,500,000 *yen* or 2,000,000 *yen* in Seiko District, Kanko, about April next. It is understood that in accordance with the result obtained by the laboratory a company with a capital of about 30,000,000 *yen* will be established.

DAI NIHON JINZO HIRYO K.K. (Japan Artificial Fertilizer Co.) Superphosphates.—For some time the company has been carrying on experiments in manufacturing superphosphates with a high degree of 30 per cent. soluble at its Onoda Factory, in Yamaguchi Prefecture. It is reported that the experiments have been successful and a plan to manufacture 60,000 bags a month has been carried out. Formerly manufactures in the Kwanto were of 19 per cent. of the Kwansai 15 per cent. It is hoped that exports to China will increase, in view of the geographical advantage of Onoda Factory.

HOKUYETSU SEISHI K.K. (Hokuyetsu Paper Mfg. Co., Ltd.)—The company is installing a 110 inch paper making machine at its Niigata Mill, to replace an old machine. The new machine was bought from the Government Printing Bureau. When the installation is completed, it will be devoted to the manufacture of printing paper, chiefly to supply "Yen Library" publishers.

NIPPON SEKIYU K.K. (Japan Petroleum Co., Ltd.)—Mr. Nakano, chief of the mining department of the company, is now in Formosa on an inspection trip. He expects to stay there about three weeks investigating as to the plans for developing oil fields in the territory. Consumption of oil in Formosa has been increasing rapidly and imports are rising.

RAILWAYS

STEEL SLEEPERS.—An initial order for 70,000 steel sleepers equalling 5,000 tons of steel has been placed with a British firm by the Southern Railway, which is the first British company to adopt the steel sleeper in preference to timber. The supply ordered will enable about 35 miles of selected track to be equipped over a period of two years.

The rising price of imported timber sleepers, whereof 4,000,000 are used annually on British railways, is the chief reason for the change, but the Southern Railway is also guided by a desire to help British industries and to experiment with the new sleepers already in use in some places abroad, where it is estimated their life will be about thirty years against twenty years in the case of timber sleepers. In view of these circumstances it is believed that steel may in the end prove more economical.

NEW RAILWAYS IN MANCHURIA.—Various new railway lines have been projected. One of these is the Mukden-Fakumen line, which is probably intended to be extended further northwest to Chengchiatun, thus affording Mukden direct communication with Tsitsihar, without having to use the roundabout way over Tahushan. It is reported that $30,000,000 is to be raised for this purpose, one-third each by the Government, the principal banks and public subscription. Another railway is being planned from Hailungchang E. S. E. to Fusung and a surveying party has already been sent out by the Mukden-Hailungcheng Railway Construction Office. A third new railway scheme is said to aim at nothing less than traversing the whole of Eastern Kirin by a railway extending from Kirin Ne, across the C.E.R. to Fangcheng on the Amur River, for which purpose $80,000,000 is to be raised.

SIAM'S RAILWAYS.—A number of important orders have recently been received by British firms in this country from the Siamese Royal State Railways. An order for 30 third-class coaches with steel bodies has been placed with the Midland Railway-Carriage and Wagon Company, Birmingham; an order for 20 third-class coaches with wooden bodies has been placed with the Metropolitan Carriage, Wagon, and Finance Company, Birmingham; and another for 16 first-class coaches with wooden bodies has been placed with the Cravens Railway-Carriage and Wagon Company, Sheffield. These orders were obtained in face of foreign competition. The whole of the stock is to be built under the inspection of Messrs. C. P. Sandberg, of London, the consulting and inspecting engineers for the Siamese Government. The contracts have been placed by H.R.H. Prince Purchatra, the Minister of Communications for Siam, who will shortly visit England.

YELLOW RIVER BRIDGE REPAIRED.—An official report by Mr. A. J. Hearne, of the Ministry of Railways, states that the Yellow River bridge is now completely repaired and through traffic on the Tsinpu railway is possible as soon as arrangements have been made with the Japanese.

A test train of four cars under Mr. Hearne's direction and carrying the foreign Consular body and Japanese civil and military authorities and also over 50 prominent guests, successfully crossed the Yellow River bridge on January 20. Resumption of work in the Tsinan workshops has been sanctioned by the Japanese so long as they are notified of the nature and outline of the work.

Within three weeks two locomotives can be repaired there. The first lot of rolling stock released is made up of two locomotives (one damaged), four passenger cars and ten goods wagons. All were conveyed to Taian and will reach Pukow soon.

Running a train between Pukow and Tsinan requires six locomotives and 100 goods wagons. Mr. Hearne has been instructed to remain in Tsinan to continue negotiations. Japan is ready to discuss resumption of through traffic but has conditions to impose regarding through goods traffic. The Shantung Commissioner for foreign affairs and the Japanese Consul and railway representative are negotiating on the same matter.

CHINESE GUNBOAT LAUNCHED.—The launching of the gunboat Yung Sui, constructed at the Kiangnan Dockyards to the order of the Chinese Navy, for service in the Upper Yangtze, took place recently.

NEW VESSELS FOR THE YANGTZE SERVICE.—The newest ship of the Yangtze Rapid Steamship Company, the *I'tu* slid down the ways at the Huh Hsing yard on the Nantao Bund and will shortly be placed in commission on the usual up-river run by her owners.

The new addition to the Yangtze Rapid line is the largest of the fleet and embodies many new features not heretofore found in river boats. She is driven by two Benz full Diesel motors supplied through Messrs. Jebsen & Co. and is capable of 1,050 horsepower, which will drive her at an estimated speed of 14 knots.

New N. Y. K. Vessel.—The Kiangnan Dock and Engineering Works launched a twin screw steamer built to the order of the Nisshin Kisen Kaisha for their Ichang-Chungking service. The vessel is for all the year round service, 153-ft., by 29-ft. beam by 8-ft. 6-in. deep to main deck, draft 6-ft. 6-in. fully loaded, to carry passengers, general cargo and a certain quantity of wood oil in deep tank. The upper deck is arranged for 1st and 2nd class Chinese passengers, and officers and foreign passengers are accommodated on the bridge deck. Arrangements have also been made to accommodate a certain number of third class Chinese on the main deck, when this space is not being used for cargo.

The propelling machinery consists of twin triple expansion engines developing about 2,200 indicated horsepower constructed at the works, with two Thornycroft water tube boilers, which will drive the ship at a speed of about 14 knots loaded.

This vessel is a sister ship of the well-known steamers *I'Ling* and *I'Ping*, previously constructed by the Kiangnan Dock, which have proved themselves very successful ships.

NEW GUNBOATS FOR CHINA ARE LAUNCHED.—Three river gun-boats, *Poh Hsien*, *Fe.-Yen* and *Chia-Lu*, of Kiangsu province were launched to-day at the Kiangnan dockyards. The gun-boat, *Cheng-Chi*, which was launched last year, and the three vessel launched lately were built by the Kiangnan dockyards for a sum of $240,000 from the Kiangsu province treasury.

THE *SAN LUIS MARU*.—The 10,300 ton Japanese-built *San Luis Maru*, a sister vessel to the *San Diego Maru*, already completed, has been launched. She is 430-ft. in length, having a beam of 57-ft. and a depth of 34-ft. 5-in., and was built by the Mitsubishi Zosen Kaisha to the order of the Mitsubishi Trading Co. A six-cylinder Sulzer-type engine constructed by the hull builders is installed, developing 2,250 b.h.p. at 110 r.p.m. and having cylinders 600 mm. bore with a piston stroke of 1,060 mm.

THE *SHUNTEN MARU*.—To the order of the Yamamoto Shoji K.K., the motor vessel *Shunten Maru* has now been completed. Of 9,000 tons deadweight, this ship has a length of 405-ft., a beam of 55-ft. and a depth of 32-ft. A six-cylinder Sulzer-type engine, constructed in Japan under licence by the Mitsubishi Dockyard Co., is installed, developing 2,250 b.h.p. at 110 r.p.m. and having cylinders 600 mm. bore, with a piston stroke of 1,060 mm. The *Shunten Maru*, which was built at the Mitsubishi Dockyard, will maintain a sea speed when fully laden of $13\frac{1}{4}$ knots.

A SMALL JAPANESE TANKER.—The small Japanese tanker *Midori Maru* has been launched from the Mitsubishi Zosen Kaisha's yard for the Osaka Shosen Kaisha, a firm which has five larger motor vessels on order and several in service. She is equipped with two engines with four cylinders 420 mm. in diameter and having a piston stroke of 620 mm.; the total power is 1,200 b.p. The gross tonnage is 1,700 and the deadweight capacity 2,500 tons. The length is 243-ft., the beam 38-ft. and the depth 19-ft. 5-in. The order for this vessel has not previously been announced.

THE *SAN DIEGO MARU*.—Some time ago the motor ship *San Diego Maru* was completed for the Mitsubishi Trading Co., at the Mitsubishi Dockyard. She is a vessel of 10,300 tons deadweight, and is 430 ft. long, having a beam of 57-ft. and a depth of 34-ft. 5-ins. A six-cylinder Sulzer-type engine constructed by the builders of the hull is installed, having cylinders 600 mm. bore and a piston stroke of 1,060 mm. It develops 2,250 b.h.p. at 110 r.p.m.

ROADS

NEW KAIFENG ROADS COMPLETED.—The motor roads connecting Kaifeng with Taian have been completed. The highway bureau which placed some time ago an order for 20 omnibuses in America.

NEW MOTOR ROAD IN HONAN.—The motor road between Shenchow and Tungkwan has been completed. The road is about sixty miles long and has cost the provincial treasury some $200,000. About 7,000 soldiers and civilians were employed on the work, which took less than three months. With the completion of the road it is possible to make the trip between Shenchow and Sianfu, provincial capital of Shensi, by bus in ten hours.

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NEW CHINESE NAVY BOATS

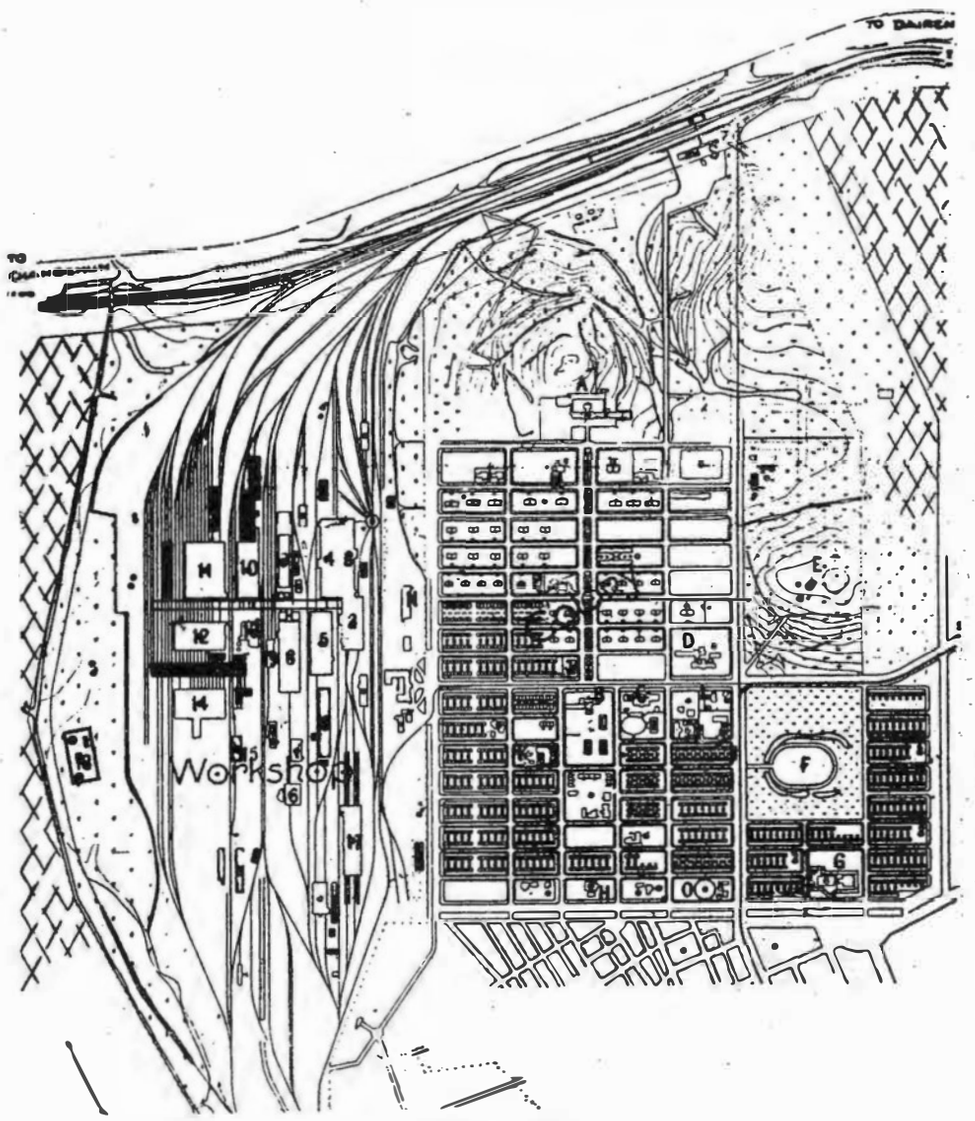
Vol. XXV March, 1929 No. 3

SHANGHAI, PEKING, TOKYO AND MANILA

General View of the Shakako Works of the South Manchuria Railway Company at Dairen

S.M.R. Shakako Shops

THE largest and best equipped railway workshop in the Far East is operated by the S.M.R. at Shakako, a suburb of Dairen. Originally, a small central railway shop had been erected in Dairen to meet the requirements of the railway and to do outside work. Other smaller shops were located at Liaoyang, Kungchuling and Antung. When the S.M.R. took over active direction of the line, one of its first steps was to lay out a modern workshop at Shakako (about 4 miles from Dairen) completing its erection in 1911 at a cost of Y.4,500,000. Its original capacity was to execute repairs simultaneously on 25 locomotives, 36 passenger cars and 130 freight cars of 30 tons each and at the same time construct and repair other railway and mining machinery. Most of the original equipment for the building and shops was purchased in England, with the exception of ten steel structures for the locomotive and machine shop supplied by the Morgan Engineering Company of Ohio, U.S.A. A complete description of the original plant giving the details of the mechanical equipment of the shops and the names of the makers was published in the August 1914 number of the "Far Eastern Review." The supply



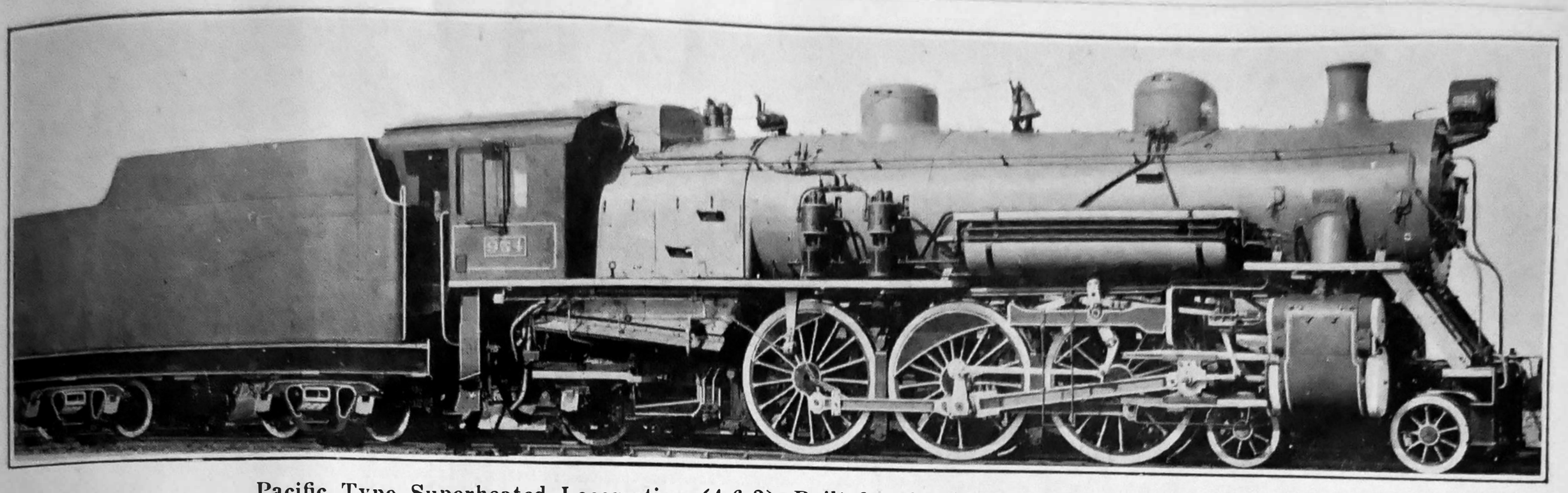
Plan of Shakako Works

1	General Office.	12	Passenger Car Shop.	E	Shrine.
2	Boiler Shop.	13	Power Station.	F	Recreation Ground.
3	Erecting Shop.	14	Paint Shop.	G	Sewage.
4	Machine Shop.	15	Veneering Shop.	H	Temple.
5	Smithy.	16	Steel Foundry.	J	Co-operative store.
6	Tool & Electric Repairing Shop.	17	Girder Shop.	K	Kindergarten.
7	Brass Foundry.	18	Pumping Station.	L	Church.
8	Foundry.	19	Pattern Shop.	M	Superintendent's Residence.
9	General Store.	A	Primary school.	N	Testing Laboratory.
10	Truck Shop.	B	Club-House.	O	Gas Holder.
11	Saw Mill & Freight Car Shop.	C	Lodging for Bachelors.	P	Public Bath.
		D	Hospital.	S	Shakako-Station.

of machine tools v about equally divic between British a American manuf turers. Although ma new machines have si been added, amon which one notices ma of Japanese make, equipment still ne bringing up-to-date.

The main plant mains more or less same as when it laid out in 1912. works to-day cover total area of 490 ac of which 225 acres occupied by the wo shops and yards and balance by residen quarters for the s and workmen. T workshop buildi alone cover 16.5 ac There is a total p sonnel attached to works of about 3,0 Contrary to the gene belief in China, majority of the skil workmen are Chin whose efficiency is ra as high as their Japan co-workers. At pres there are 1,174 Chin and 1,102 Japan skilled mechanics ployed at the Shak Works, with unskil labor divided ab equally between Chin and Japanese, 285 the former and 260 the latter. Altoget the works employ total of about 3,000.

The present ann capacity of the wo enables them to b 40 new locomotives, new passenger coac and 650 new frei cars. Practically ev part of the cars



Pacific Type Superheated Locomotive (4-6-2) Built for the S.M.R. at the Shakako Works

Gauge of Track, 1435 m.m.

LOADED WEIGHTS.	
On driving wheels	68.95 k.g.
On leading truck	17.20 ,,
On trailer	22.10 ,,
Total engine	108.25 ,,
Tender	85.00 ,,
Engine and tender	193.25 ,,

WHEEL BASE.	
Driving	3,960 m.m.
Total of engine	10,480 ,,
Total of engine and tender	21,318 ,,

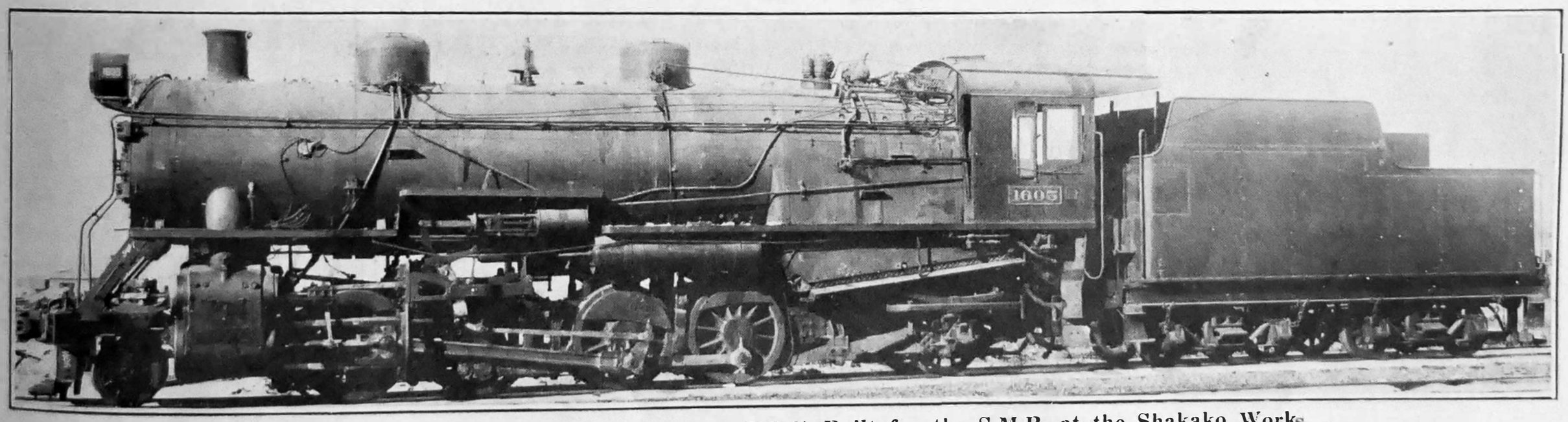
CYLINDERS.	
Diameter	584 m.m.
Stroke of piston	710 ,,
Valve, kind	piston.

WHEELS.	
Diameter of driving	1,850 m.m.
Diameter of engine truck	840 ,,
Diameter of engine trailer	1,120 ,,
Diameter of tender truck	840 ,,

JOURNALS.	dia. × length
Driving	267 × 320 m.m.
Engine truck	140 × 320 ,,
Engine trailer	203 × 375 ,,
Tender truck	127 × 228 ,,

BOILER.	
Type	Straight top.
Working pressure per sq. cm.	14.06 k.g.
Outside diameter of first ring	1,785 m.m.
Fire box, length and width	2,587 × 1,860 ,,
Tubes, number and outside diameter	145 pcs. 51 ,,
Flues, number and outside diameter	32 pcs. 136.5 ,,
Length between tube sheets	5,521 ,,
Heating surface, tubes and flues	127.77 M²
Heating surface firebox	22.30 ,,
Heating surface, total	150.07 ,,
Superheater heating surface	75.78 ,,
Equivalent heating surface	150.07 + (1.5 × 75.78) = 263.74 ,,
Grate area	4.81 ,,

TENDER.	
Tank	Water bottom.
Frame	Channels.
Water capacity	35,000 L.
Coal capacity	13.4 k.g.
Maximum tractive power	15.7 ,,



Mikado Type Superheated Locomotive (2-8-2) Built for the S.M.R. at the Shakako Works

Gauge of Track, 1435 m.m.

LOADED WEIGHTS.	
On driving wheels	87.99 k.g.
On leading truck	9.53 ,,
On trailer	22.00 ,,
Total engine	119.52 ,,
Tender	61.46 ,,
Engine and tender	180.78 ,,

WHEEL BASE.	
Driving	4,826 m.m.
Total of engine	10,414 ,,
Total of engine and tender	19,088 ,,

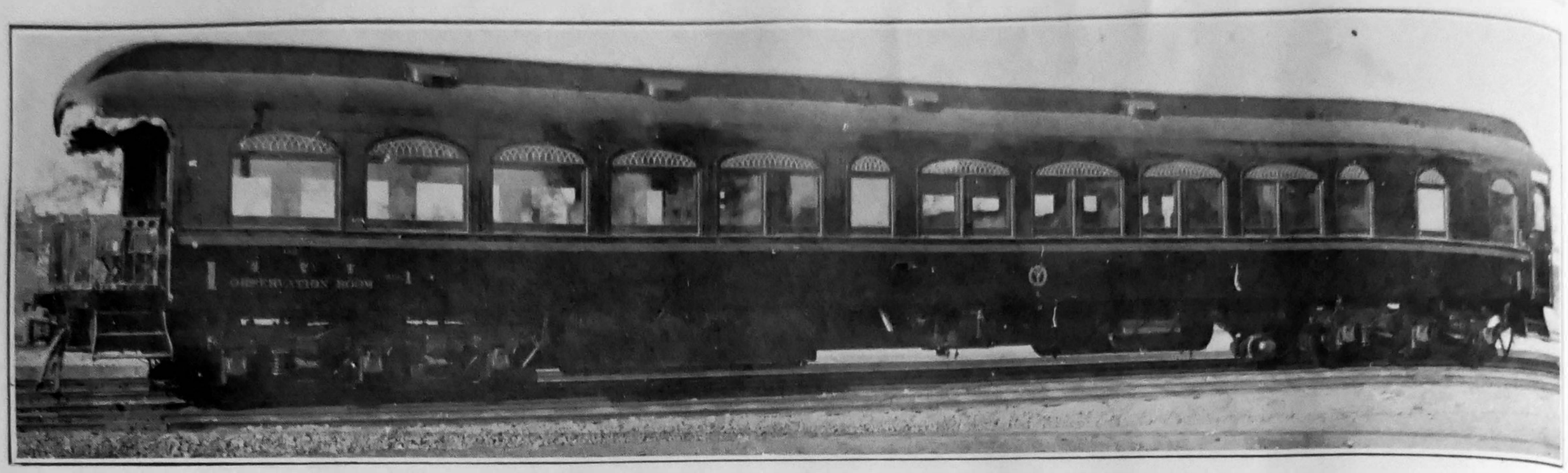
CYLINDERS.	
Diameter	572 m.m.
Stroke of piston	660 ,,
Valve, kind	Piston

WHEELS.	
Diameter of driving	1,370 m.m.
Diameter of engine truck	840 ,,
Diameter of engine trailer	1,120 ,,
Diameter of tender truck	840 ,,

JOURNALS.	dia. × length
Driving	254 × 305 m.m.
Engine truck	165 × 305 ,,
Engine trailer	203 × 356 ,,
Tender truck	127 × 229 ,,

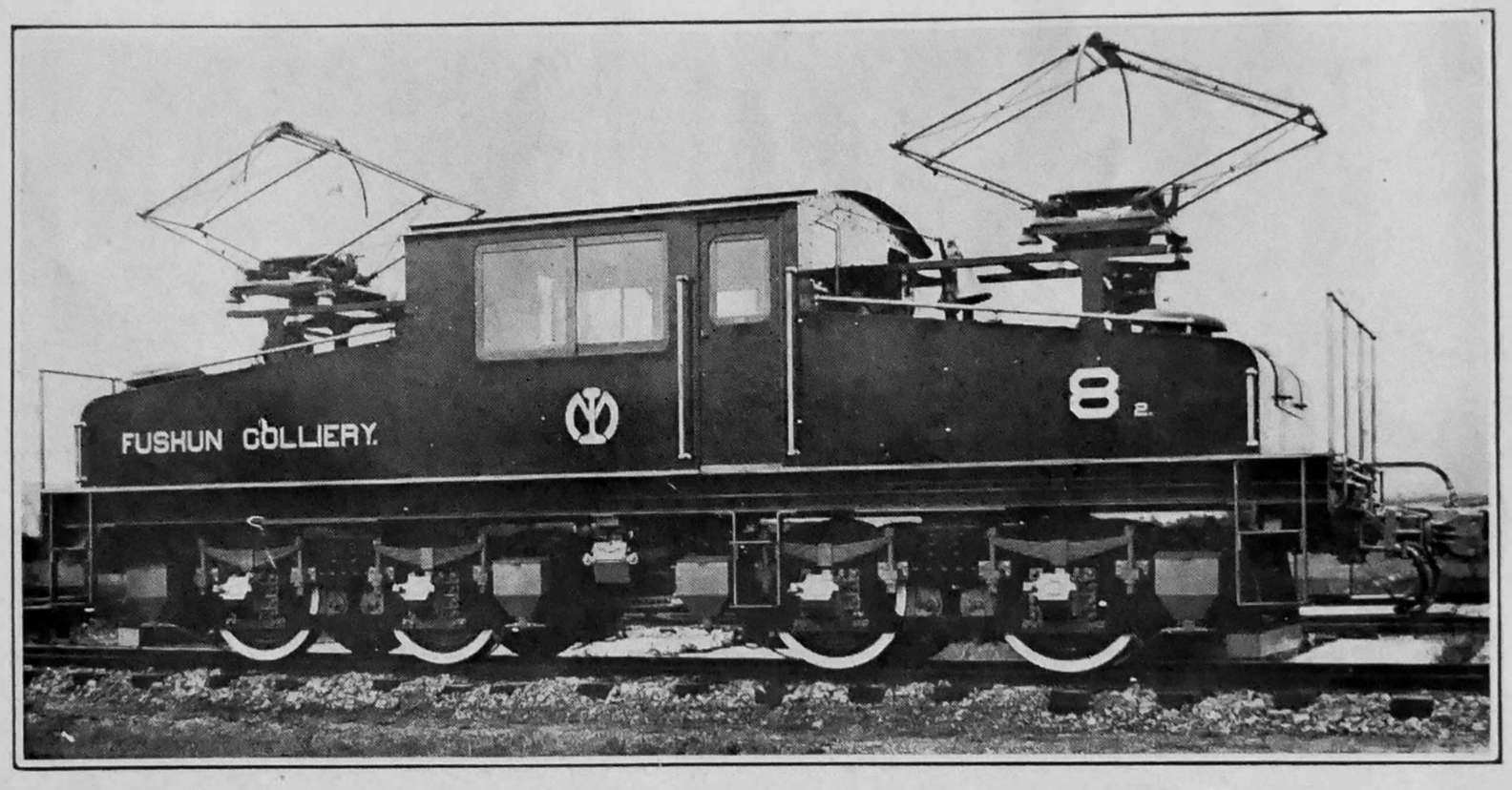
BOILER.	
Type	Straight top.
Working pressure per sq. cm.	12.7 k.g.
Outside diameter of first ring	2,065.4 m.m.
Fire box, length and width	2,921 × 2,140 ,,
Tubes, number and outside diameter	245 pcs. 51 ,,
Flues, number and outside diameter	42 pcs. 137 ,,
Length between tube sheets	5,638.7 ,,
Heating surface, tubes and flues	323.11 M²
Heating surface firebox	20.16 ,,
Heating surface, total	343.27 ,,
Superheater heating surface	87.79 ,,
Equivalent heating surface	343.27 + (1.5 × 87.79) = 474.96 ,,
Grate area	6.25 ,,

TENDER.	
Tank	Water bottom.
Frame	Channels.
Water capacity	22.700 L.
Coal capacity	13 k.g.
Maximum tractive power	25.40 k.g.



All Steel First Class Pullman Observation Car Built at the Shakako Works

locomotives are made at the works with the exception of the larger steel pieces for locomotives. The locomotives for the S.M.R. system follow the American practice, and the steel frames as well as the main axles and driving wheels are supplied to the works by the Sumitomo Steel Works at Osaka. The Works have their own steel plant for small castings and a well equipped forge house. The annual increase in the S.M.R. rolling stock required to handle the normal increase in the volume of traffic together with the rolling stock requirements of the new Chinese railways under construction in Manchuria has kept the Shakako Works busy. In fact, the press of new work has compelled the S.M.R. authorities to call in outside assistance. Orders for new all-steel railway cars and other structural steel work have been placed with the Dairen



50 Ton Electric Locomotive Built for the Fushun Colliery at the Shakako Works

Gauge of Track, 1435 m.m.

WEIGHT.

Net weight of locomotive	44.09	k.g.
Ballast weight	6.90	,,
Weight on drivers	50.98	,,
Weight per pair of drivers	12.75	,,
Weight of one motor	2.27	,,

WHEEL BASE.

Total wheel base	6,324.5	m.m.
Rigid wheel base	1,600	,,

MOTORS.

No. and size of motors	4-125 H.P.
Trolley voltage	1,200 volts D.C.

WHEELS.

No. of driving wheels	8	
Diameter of driving wheels	1,016	m.m.

AXLES.

Diameter between wheels	171	m.m.
Diameter at motor suspension	171	,,
Diameter at gear	175	,,
Diameter at journal	116	,,

GEAR RATIO.

Gear ratio	1 : 5.53

CAB.

Type	Steel sloped.	
Length over cab	8,941	m.m.
Height over cab from top of rail	3,353	,,
Length bet. knuckle faces	10,972	,,
Width over all	2,946	,,
Height with trolley down	3,518	,,

CAPACITY.

Max. instantaneous tractive effort	12.88	k.g.

Engineering Works and the Manchuria Dock Company. The erection of an entirely new machine shop at the Fushun Colliery has taken over practically all the work for that subsidiary enterprise of the S.M.R. In fact, the new industrial activities of the S.M.R., the expansion of its traffic requirements together with the possibilities opened up by the extensive program of new Chinese railway construction in Manchuria and Mongolia has created a local engineering market that justifies the hope of the management that the Shakako Works may be developed into an independent manufacturing enterprise.

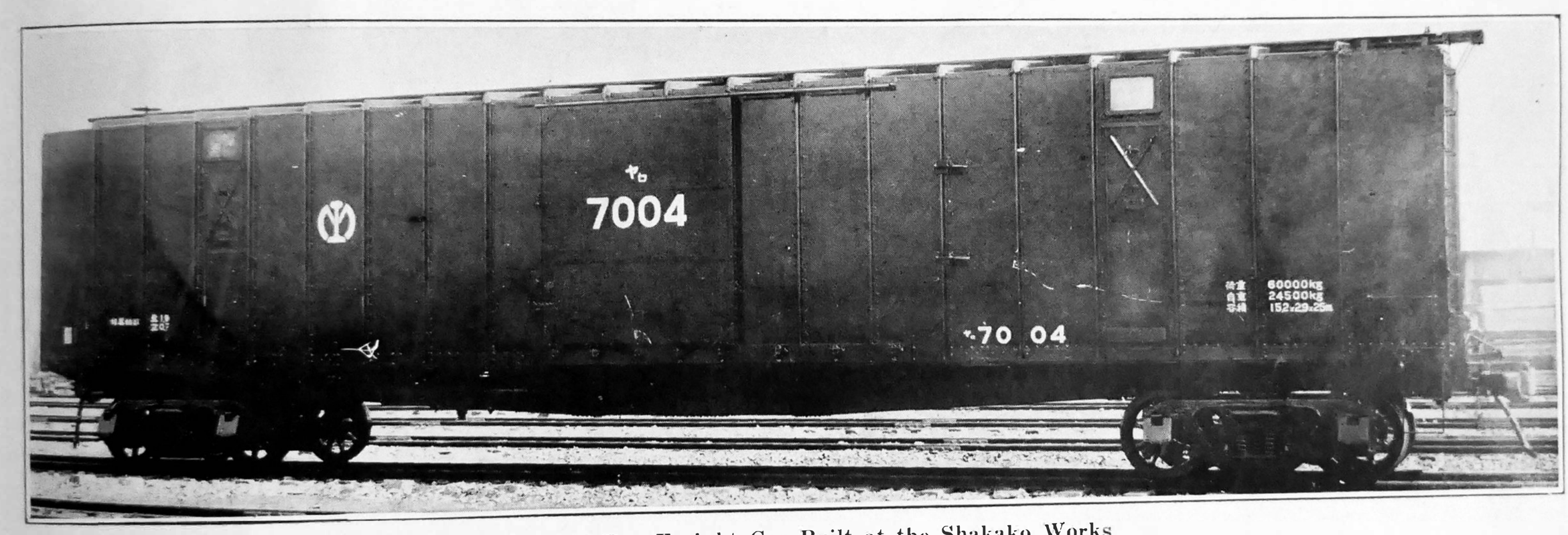
For the present fiscal year 19 new locomotives are to be built for the S.M.R. Six of these will be of the Pacific type for passenger service and 13 Mikado type for freight. The Shakako Works will build the

All Steel Third Class Passenger Coach Built at the Shakako Works

All Steel Second Class Passenger Coach Built at the Shakako Works

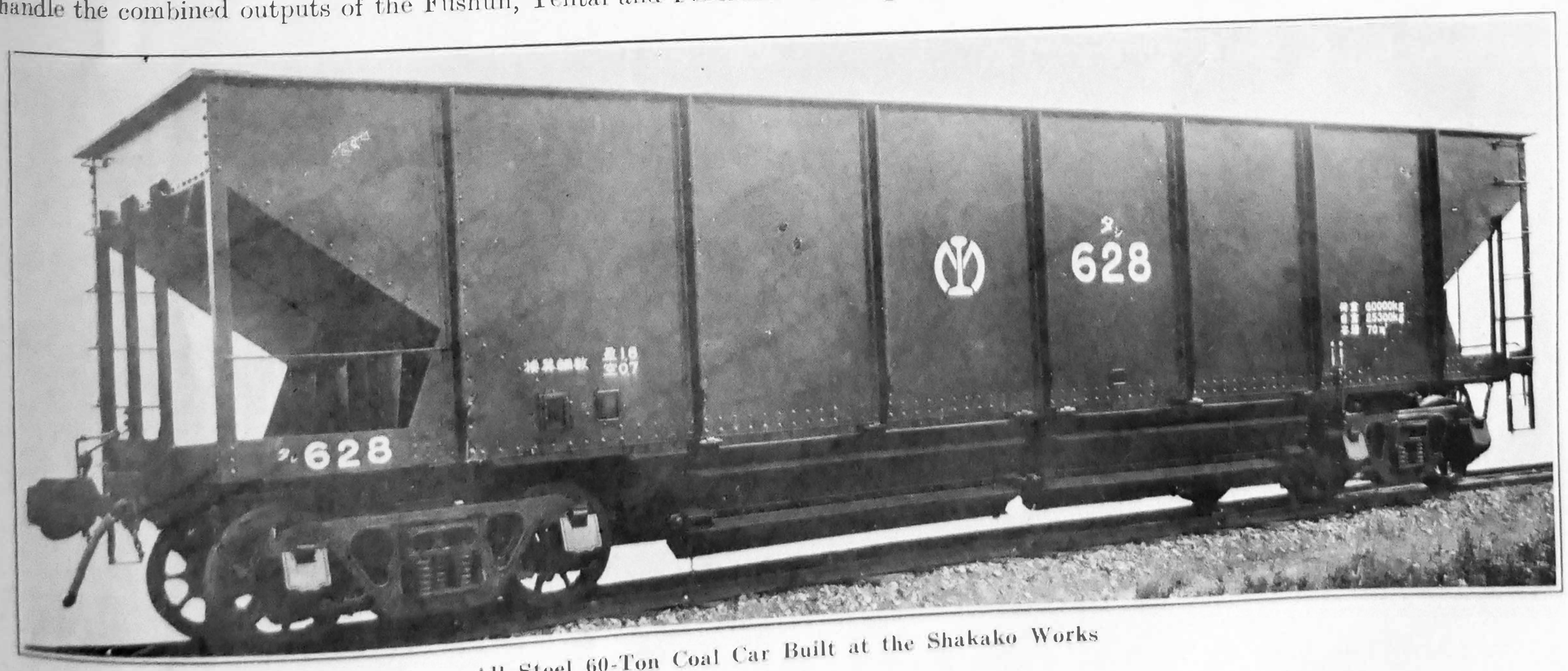
six Pacific type passenger locomotives and six of the Mikado type. The Kawasaki Dockyard has been awarded the contract for three Mikadoes and the Nagoya Railway Car Manufacturing Co. will build the other four. The contract price for the locos to be made at the Shakako Works is Y.97,000 per engine, while the Japanese manufacturers' bid was Y.131,000. This difference of Y.34,000 in the cost of manufacturing between Japan and China is of interest as denoting some of the handicaps Japanese engineering manufacturers must contend against in competing for export business, and which at present do not exist in China. These conditions, however, may be modified by the operation of the new Chinese protective tariff.

The transport efficiency of the S.M.R. lines must be increased to handle the combined outputs of the Fushun, Yentai and Penshihu coal mines, which this year will reach 8,700,000 tons. Most of the rolling stock expenditure for the current fiscal year will go towards the construction of new all steel 60-ton coal cars. Over 200 of these cars are already in operation. The estimates for 1928 provides for 400 freight cars of which 150 are 60-ton and the balance 30 ton cars. The estimate for building these 60-ton all steel cars in Dairen, we understand, is Y.13,000.



All Steel 60-Ton Freight Car Built at the Shakako Works

A further increase in the number of new goods cars will be necessary to handle the increased volume of freight for the current year. The actual volume of freight carried in 1927 was 18,427,775 tons, an annual increase of about 1,000,000 tons a year for the last ten years. The expanded output of the Fushun mines and the Anshan Iron & Steel Works in addition to the increase in crops arriving from the settlement and cultivation of vast tracts of virgin

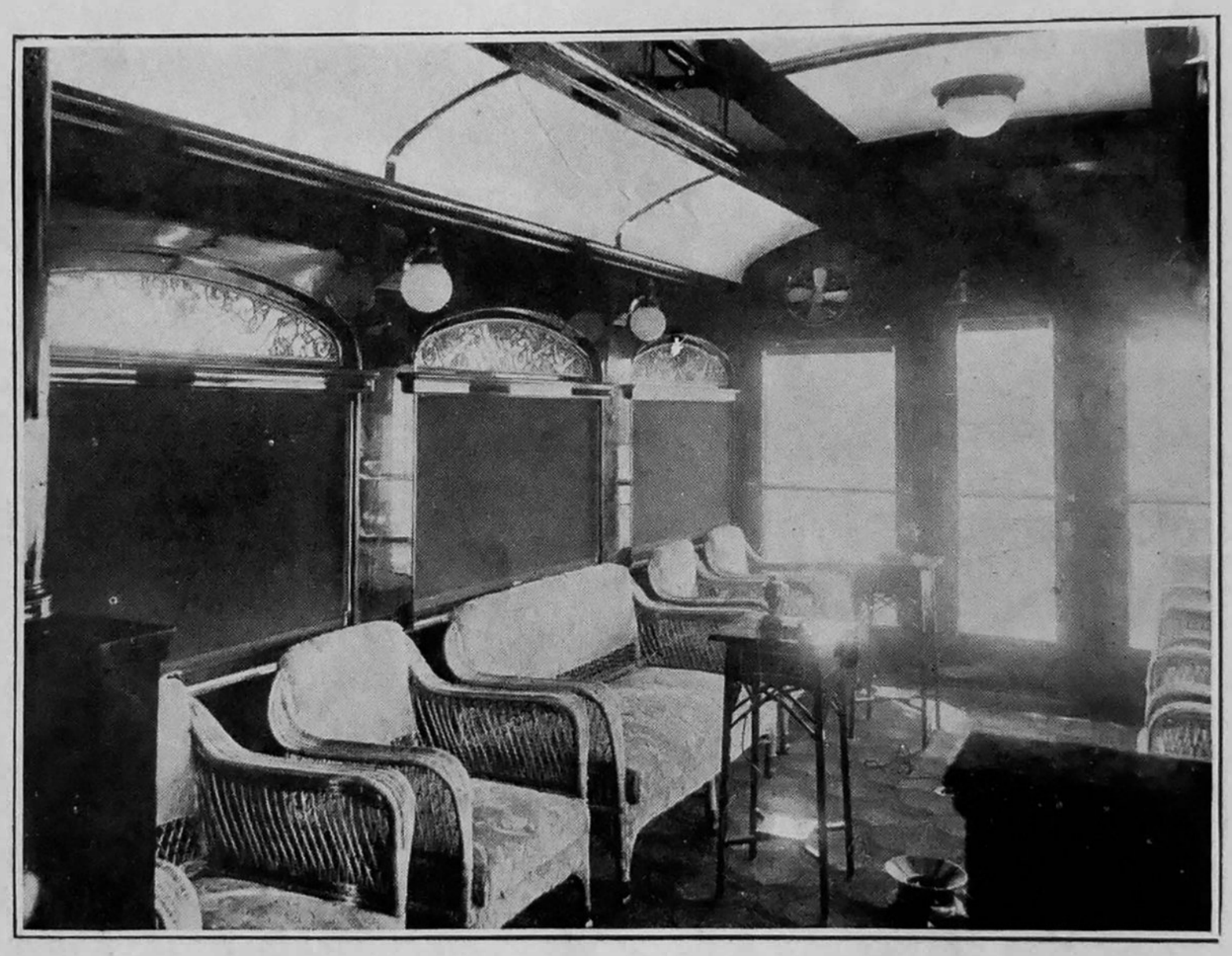


All Steel 60-Ton Coal Car Built at the Shakako Works

Interior of All-Steel Second Class Passenger Coach Built at the Shakako Works

Interior of All-Steel Third Class Passenger Coach Built at the Shakako Works

lands by the millions of home-seekers from North China, will easily increase the volume of freight for next year to over 20,000,000 tons. The steady construction of new Chinese lines in Manchuria feeding into the S.M.R. is also expected to raise the volume of traffic and provide an outlet for new rolling stock that will tax the capacity of the Shakako Works to meet. The electrification of the Open Cut Workings at Fushun, the Anshan Iron & Steel Works yards and the branch line to the Coal Loading pier at Kanchingtzu, will call for at least ten new electric locomotives of the Fushun type. Several of these locomotives now in operation were built at the Shakako Works and it is entirely probable that the additional equipment will also be turned out there.



Interior of Observation Car for the S.M.R. Built at the Shakako Works

Some idea of the rolling stock manufactured at the Shakako Works is given in the illustrations and particulars of the locomotives, passenger and freight cars accompanying this article. The Shakako Works are now building four Pacific type locomotives for the Ssupingkai-Taonan Railway. Locomotives have also been built at these works for the Chosen Government and the Indo-China State Railways.

The Shakako Works also manufacture cast-iron pipe of all sizes up to 1 meter in diameter. Practically all of the cast-iron pipe used in Dairen and on the towns along the S.M.R. is turned out at these Works, as well as valves and other fittings.

Japanese Government Railways in Kyoto-Osaka District

(Continued from page 127)

the Kansai line and the Katamachi line will make a detour to the Osaka freight station *via* Suita.

Osaka Harbor Line

The Osaka harbor line starts at Imamiya of the Kansai line and ends at Fukuzakimachi where it is joined with the Municipal pier line. It was nearly 30 years ago that the construction of this harbor line was advoczted for the first time. But the opinion was divided as to whether the line should run towards north or whether to south, and it was finally decided on the present route, in consideration of the fact that there is the Nishinari line in the northern section of the city.

The work was commenced in August, 1923, under the joint investment by the Railway Office and the Osaka Municipality, of Y.5,960,000 and Y.6,110,000, respectively. The mileage extends to 5 miles and 20 chains. One of the striking features of this line is that there are three lift-bridges on this short line, spanning across canals. This line is capable of transporting approximately 700,000 tons of freight a year.

In connection with this Harbor line, there is an important problem of building a large freight station in the southern part of Osaka city. At present, Imamiya and Minatomachi stations handle freight. Of the two, Minatomachi station is more important and it dispose of 900,000 tons of freight a year. This Minatomachi station, however, is very small, and it must be extended, but there is no room to extend the station. It is true that a large portion of the foregoing 900,000 tons of freight accumulates at the Minatomachi station on account of its occupying an advantageous locality, but it is equally true that a considerable amount of it are being handled there on account of the lack of other proper freight stations. With this in view, it is planned to build a new freight station somewhere in the southern section of the city, but so far nothing definite is available.

Engineering Notes

ELECTRIC LIGHT, POWER AND TRACTION

UJIGAWA DENKI K.K. (Ujigawa Electric Power Co., Ltd.).—The Omine Power Plant of the Ujigawa Denki K.K., capacity 20,000 k.w. (two units of 10,000 k.w. each), has been equipped with automatic operating devices, and it is reported to be the largest automatic power station so far constructed in Japan. The use of this device is gradually increasing, as a means of saving expenses and improving efficiency.

DAIDO DENRYOKU K.K. (Great Consolidated Electric Power Co., Ltd.).—In order to avoid excessive dependence on steam power, as is the case in Osaka at present, the company is planning to construct a big reservoir on the Kiso River to ensure water power resources and increase generating capacity at the Kiso River power plants. On the site selected near the Imperial Forests at Miura, in Nagano Prefecture, a reservoir with 4,000 million cubic feet capacity will be constructed at an estimated cost of Y.2,000,000. The plan has been unofficially approved by the Imperial Household Department. When all power plants on the Kiso River are completed, the total generating capacity will be 370,000 k.w.

TENRYUGAWA DENRYOKU K.K. (Tenryugawa Electric Power Co., Ltd.).—The Minamimuki Hydro-Electric Power Station, capacity 25,000 k.w., has just been completed and passed government inspection and operation has been started. The construction was begun in July, 1926.

SHANGHAI ELECTRICTY.—Tenders for the proposed purchase of the Shanghai Municipal Electricity Department have been submitted. The three groups who submitted tenders to the Electricity Special Committee (1929) based upon the above Memorandum of Franchise were :—The Hon. R. D. Denman ; British Trusts Association Ltd.; and the American and Foreign Power Company, Inc.

The tenders were opened by the Chairman of the Council in the presence of the representatives of the tenderers and the Electricity Special Committee.

The following offers were made :—

First : The Hon. R. D. Denman's offer for leasing :—

In brief the scheme is that a S. M. E. Company lease the undertaking on terms of paying for the interest and Sinking Fund Instalments on all the Council's Electricity Loans plus a fixed rent of Tls. 2,000,000 per annum. After the payment of a 9 per cent. dividend on the Company's ordinary shares, three-quarters of the surplus profits go to the Council and one-quarter to the Company. A sliding scale of benefits to consumers is included, which operates after 10 per cent. is paid, not on the whole capital of the Company, but on the ordinary shares only.

Second : British Trusts Association Ltd :

Offer (A) : Fifty-one million Taels—under the terms and conditions of the Memorandum of Franchise.

Offer (B) : £7,200,000. Sterling.—Conditional upon certain amendments to paragraphs 8 and 13 of the Committee's Memorandum of Franchise.

Offer (C) : An offer to lease on terms to be mutually agreed upon.

Third : American and Foreign Power Company, Ltd. Inc.

Eighty-one million Taels—under the terms and conditions of the Memorandum of Franchise.

These offers will be taken under consideration by the Electricity Special Committee who will make their recommendations thereon to the Council.

KEIHANSHIN KOSOKUDO DENKI TETSUDQ.—A new high speed electric railway is being planned between Kyoto and Kobe *via* Osaka. The line is to start from 4-chome, Nunobiki, Kobe, pass near Osaka Station (Government Line) and along the southern coast of Yodo River and terminate at Higashi Shiokoji, Kyoto. The Kobe-Osaka section is to be covered in 25 minutes, between Osaka and Kyoto in 35 minutes. The total capital is estimated at Y.70,000,000.

POWER CONTRACT WITH TOKYO MUNICIPAL ELECTRIC BUREAU.—A power contract just signed is for 5,000 k.w., maximum 37,000 k.w. The rate of charges is stipulated at 2.28 sen per k.w.h. ; load factor 55 per cent. ; delivery to be made at Shibuya substation, and Konuma Substation. The contract is to be in force from April 1, 1929, to March 31, 1930. Nippon Denryoku must construct a new power transmission line from Kawasaki Substation to Tokyo Municipal substation at Shibuya, at a cost of some Y.1,000,000, and supply will be started around October this year, it is reported.

The 5,000 k.w. given in the contract is for a natural increase of supply, while the maximum of 37,000 k.w. is to provide for emergency that may happen with Kinugawa Denryoku's power supply of the same amount.

TSUKUBA KOSOKUDO DENKI TETSUDO K.K. (Tsukuba High Speed Electric Railway Co., Ltd.).—The plan of this company to build an underground railway from Nippori to Ueno, Tokyo, has been licensed by the Department of Railways. The distance of the route is one mile 30 chains from the projected Nippori Station to below Saigo's Statue in the Ueno Park, near the Ueno Station. The cost of construction for this underground section is estimated at Y.4,000,000. The company is now carrying on construction between Nippori and Senju, near Tokyo.

UJIGAWA DENKI K.K. (Ujigawa Electric Power Co., Ltd.).—Ujigawa Denki K.K. is now operating an electric railway between Kobe and Himeji (formerly known as Kobe-Himeji Denki Tetsudo). The company is planning to establish a new company to take over the property and to extend the present line as far as Okayama City, in Okayama Prefecture, for 52 miles.

Ths cost of construction for extensions is estimated at about Y.5,000,000 and the line is to start from Shikama, and passing through Aboshi, Akaho, Hibu, Katagomi, Kato, Saiaaiji, Hirai, Asahikawa and Daigen, will run along the Uno Line of the Government Railway to Okayama. The gauge will be 4-ft. 8½-in.

The new concern is to be known as the Sanyo Denki Tetsudo K.K., and is to be capitalized at Y.20,000,000.

RAILWAYS

JAPANESE DEPARTMENT OF RAILWAYS TO BUY PRIVATE LINES.—The purchase of private railways has been decided by the conference of high railway officials, as follows :

Hinokami Tetsudo, Anan Tetsudo, Uwajima Tetsudo, Hakatawan Tetsudo, Hokkaido Tetsudo, Iwate, Keiben Tetsudo, Kamaishi Kozan Tetsudo, Shinano Tetsudo, Ikeda Tetsudo, Chugoku Tetsudo, Ryobi Tetsudo, Geibi Tetsudo.

Also the Department has decided to give compensation to the following three railways. Arita Tetsudo, Chikugo Kido, and Yamaguchi Prefectural Railway.

Budgets for the above are estimated at Y.50,000,000, for which bonds are to be issued, if the plan is approved by the Diet. Such a large purchase and compensation, covering as many as 17 lines, is unknown in the history of railway administration in Japan.

NEW BRANCH TO KIRIN-HAILUNGCHENG LINE.—The surveys for the new branch line of the Kirin-Hailungcheng Line under construction, that starts from Yentungshan south to Mengkiang *via* Kuankai (the Prefectural seat of Huatien) and negotiating the Nachenghung range, eventually to be extended to Linkiang (Maoerhshan) on the Korean frontiers, having been finished for most part, earthwork is to be begun on the return of the thaw. The first stage section runs from Yentungshan to Huatien (Kuankai), and the second stage section from Kuankai to Mengkiang.

NIPPON DENKI TETSUDO K.K.—(Japan Electric Railway Co., Ltd.)

License for the projected line between Tokyo and Osaka has been applied for by promoters including Mr. Nezu, Baron Go and 300 other business men in Tokyo and Osaka. The outline of the plan is as follows :

The new company is to be capitalized at Y.250,000,000, and the construction is to be completed in five years. The distance of 298 miles between the two cities is to be covered in 6 hours or at a speed of 50 miles an hour. The gauge will be 4' 8½".

Stations will be erected at : Shibuya Machi, starting point in Tokyo ; Nishi Yokohama, (Kanagawa Pref.), Gotemba Machi (Shidzuoka Pref), Shidzuoka City, Kita Hamamatsu (Shidzuoka Pref.), Okazaki City (Aichi Pref.), Nagoya City (Aichi Pref.), Kameyama Machi (Miye Pref.), Kita Nara (Kyoto Pref.), Noye Machi, Higashi Nari Ku, (Osaka) terminus.

Income is estimated at three sen a mile or Y.53,061,199 for passengers, miscellaneous Y.2,653,060, total Y.55,714,259. Expenditure is estimated at a total of 25,628,554, which leaves a balance of profit Y.30,000,000 or about 12 per cent. of the construction costs.

STATISTICS ABOUT THE MANCHURIAN RAILWAYS.—According to a recent report, the total length of the 16 railways in Manchuria is 35,448 miles. The following is a table giving the name, length and the main stations of each of the railways :

Name of the Railway	Length			Main Stations
The Chinese Eastern Railway	Main line :	924.7	miles	Harbin, Kwanchengtze.
	Branches :	148.2	,,	
Peiping-Mukden Railway	Main line :	521.9	,,	Peiping, Mukden, Kobangtze, and Yingko.
	Branches :	202.2	,,	
Ssupingkai-Taonan Railway	Main line :	185.5	,,	Ssupingkai, Taonan, Chengkatung and Tungliao.
	Branches :	74.0	,,	
Kirin-Changchun Railway	Main line :	77.9	,,	Kirin and Changchun.
Taonan-Angangki Railway	Main line :	142.9	,,	Taonan and Angangki.
Mukden-Hailung Railway	Main line :	145.7	,,	Mukden and Hailung.
Huma-Hailun Railway	Main line :	69.6	,,	Sungpu and Hailun.
Tungyu Railway	Main line :	18.0	,,	Nuermiao and Dayaoko.
Moking Railway	Main line :	37.0	,,	Shachengtze and Lishihcheng.
Holikang Railway	Main line :	35.0	,,	Lienhuapao and Holikang.
Kicheng Railway	Main line :	9.0	,,	Bengkihu and Newsingdai.
Kaitoh Railway	Main line :	39.7	,,	Kaiyuan and Sifeng.
Tientu Railway	Main line :	62.8	,,	Difang and Toudaoko.
Tsitsihar-Angangki Railway	Main line :	18.0	,,	Tsitsihar and Angangki.
South Manchurian Railway	Main line :	438.5	,,	Chungchun, Dairen, Antung and Sukateng.
	Branches :	161.7	,,	
Kingfok Railway	Main line :	63.4	,,	Kingchow, Chengtzetung and Bitzewo.

SHIMA DENKI TETSUDO K.K. (Shima Electric Railway Co., Ltd.).—The construction of this railway in Miye Prefecture has been progressing well, so that the opening of the line is now expected in May, probably on the first of the month. The line starts from Toba, in Miye Prefecture, and passing through Shima Province, terminates at Kashikojima Island, distance 16 miles. This is an islet, located near Jinmei, and is reached by a steel bridge.

NORTHWESTERN RAILWAY PLANNED.—A memorandum pointing out the advisability of a light railway between Pingtichuan, in northern Shansi, and Urga, in Outer Mongolia, to facilitate communication along the border has been jointly submitted by General Yen Hsi-shan and Mr. Chao Tai-wen, Minister of Interior, to the Central Political Council. The memorandum recommends that inasmuch as the proposed line will have a direct bearing on the border defence of the country, the Ministry of Railways be instructed to plan for its early construction.

NEW BRANCH TO KIRIN-HAILUNGCHENG LINE.—The surveys for the new branch line of the Kirin-Hailungcheng Line under construction, that starts from Yentungshan south to Mengkiang *via* Kwankai (the Prefectural seat of Huatien) and negotiating the Nachenghung range, eventually to be extended to Linkiang (Maoerhshan) on the Korean frontiers, having been finished for most part, earthwork is to be begun on the return of the thaw. The first stage section runs from Yentungshan to Huatien (Kuankai), and the second stage section from Kuankai to Mengkiang.

INDUSTRIAL

TOKUYAMA PARAPHIN PLANT.—The South Manchuria Railway Company is planning to establish a new subsidiary to operate the oil refinery at Tokuyama recently bought from Asahi Sekiyu K.K. The plant will be improved to manufacture paraphin, probably about 6,600 tons during the first year. The construction is expected to be completed before the end of this year. The new company will be capitalized at Y.2,000,000, and S.M.R. will accommodate an additional Y.1,300,000, making the total capital Y.3,300,000.

FUKUI BOSEKI K.K. (Fukui Spinning Co., Ltd.).—The construction of the mill of Fukui Boseki K.K. was completed before the end of last year, and a trial run was made on February 3. The first part of instalment comprising of 5,000 spindles will be completed before the end of April this year, and the equipment will be increased to 90,000 spindles and 1,000 looms in the future. Capital, Y.3,000,000 ; this is a subsidiary of Kinka Boseki K.K.

NEW CANTON CEMENT PLANT.—The Kuangtung Provincial Government has contracted with F. L. Smidth & Company of Copenhagen, for a new cement plant in the North River District with a capacity of 1,200 barrels per day. The plant will be situated near Ying-tak. Mr. T. Stig-Nielsen, represented the F. E. Smidth Company.

SODIUM PEROXIDE IN JAPAN.—There are three companies in Japan engaged in the manufacture of sodium peroxide : the Nipon Soda K.K., the Hodogaya Soda K.K., and the Toyo Soda K.K. The two latter are associated companies and have factories at Hodogaya, just outside Yokohama. The daily production of the Nipon Soda K.K. is stated to be 5,000 pounds, and that of the other two companies combined, 6,000 pounds. The two Hodogaya companies purchase their supply of caustic soda from British sources. The source of supply for the Nihon Soda Co. is unknown. The Japanese sodium peroxide is packed in 10-pound tins, ten tins to a wooden case. It is reported that the production of the three firms mentioned above, supplies the demand for sodium peroxide for domestic consumption.

NORTH SAGHALIEN PETROLEUM CO., LTD.—Success is reported of a new well in eastern coast oil fields, known as " Katanguri " (phonetic). The well produced oil at a depth of 88 meters. At present the Oha Fields are producing about 2,500 koku a day, and the success in new fields is said as indicating the richness of oil deposits in North Saghalien.

PLANS OF THE NEW AMMONIUM SULPHATE COMPANY.—Capital of the new company planned by Tokyo Dento, Toshin Denki, Daido Denryoku, Toho Denryoku and South Manchuria Railway Company, to manufacture sulphate of ammonia, will be Y.45,000,000, of which S.M.R. will bear Y.15,000,000.

Fixation processes to be adopted by the new concern will be those of Ude (?) and Fafler (??), for which a provisional contract has been closed at Y.1,500,000, by representatives sent abroad—Mr. Takahashi, managing director of Toshin Denki, Mr. Yokoyama and Mr. Kagiwada, both engineers. The necessary machinery are to be made by Mitsubishi Works at Kobe and the Kure Naval Engineering Works. The construction of the factory is to be completed before the end of 1931, and the productive capacity is rated at 100,000 tons in Japan and 100,000 tons in Manchuria. Concrete plans will be decided at a meeting of promoters to be called about the end of February.

OIL FIELDS IN KARAFUTO.—A contract has been signed between the Karafuto Government and the Nippon Sekiyu K.K. (Japan Petroleum Co., Ltd.) for prospecting oil fields there. The contract is good for five years from 1929 onward. Oil fields to be prospected include: Two plots owned by the company and three plots applied for prospecting in Honto Gun ; five in Ochiai Gun, five in Kushunnai Gun. Five wells are to be drilled in five years in the area agreed upon.

In case of production, the company is to pay the Karafuto Government an equivalent for 3 per cent. of oil produced, estimated at current price. The depth of prospecting is required to be 1,100 meters. The Government of Karafuto is to grant a subsidy of Y.64,000 a year or a total of Y.320,000 in five years.

SHIPPING AND SHIPBUILDING

NEW MOTOR VESSEL LAUNCHED FOR YANGTZE MAIL LINE.—The M.V. *I Fung* owned by the Yangtze Mail Line Inc., was successfully launched from the slipway of the New Engineering and Shipbuilding Works at Yangtzepoo recently.

The *I Fung* was built to the order of the Chien Hsin Engineering Co. by the New Engineering and Shipbuilding Works for the Yangtze Mail Line Inc. for service in the Middle Yangtze. It is the first vessel of its size and capacity with full Diesel engines to operate on the Middle Yangtze. It is a splendid looking vessel and when completed for service will mark another step forward in Yangtze shipping.

NEW O.S.K. VESSELS.—The *Midori-maru* and the *Sumire-maru*, excellently equipped Diesel engine boats of 1,700 tons, were recently put in service by the Osaka Shosen Kaisha for its Osaka-Beppu Line, which passes through the world-famous maritime scenery of the Inland Sea.

The company now operates a service twice daily with the new additions, and the *Murasaki-maru* and the *Kurenai-maru*, both fine pleasure boats that formerly queened it in the Inland Sea.

The new sister boats, the construction of which was based on practical experience derived from older boats, are accommodated with every modern comfort.

All the first class cabins, decorated with refined taste, are located on the promenade deck and are provided with verandahs.

The new steamers, leaving the terminal ports at night, afford a wonderful daylight trip through the most picturesque part of the Inland Sea.

NEW JAPANESE CARGO VESSELS.—The Yamashita Kisen Kaisha, which already has a 9,000-ton M.A.N. cargo ship on order with the Uraga Dockyard, will shortly order three more Diesel-engined ships, each of 10,000 tons deadweight. The order will probably go either to the Yokohama Dockyard, the Uraga Dockyard or the Mitsubishi Yard.

NEW JAPANESE SHIPOWNERS.—A new shipping company, named the Showa Kisen Kaisha, has placed an order for a motor ship which will be the first vessel of its fleet. It is to be called the *Kowa Maru* and will be 415-ft. long, with a beam of 56-ft. and a depth of 31.9-ft. The gross tonnage will be 5,800 and the deadweight capacity 9,800 tons. It will be equipped with M.A.N. machinery.

O.S.K. PLANS EXPANSION PROGRAM.—The Osaka Shosen Kaisha has announced an extensive shipbuilding program involving 11 freight and passenger boats with an aggregate tonnage of 67,900 in competition with the Nippon Yusen Kaisha. The total shipbuilding cost is estimated at about Y.22,000,000.

According to the plan, the company will build four diesel-engined freighters, each of 8,000 tons gross, for its New York cargo service. The construction expenses are estimated at about Y. 8,000,000 for all. The company will invite shipbuilders for tenders within this month.

Three freighters of 5,300 tons, each equipped with cold storage systems, will be built by the company for Y.4,000,000. These ships are expected to be completed in March next year.

Two steamers each on the company's South American and Australian services also will be constructed for a total cost of about Y.10,000,000. These ships are intended for the transportation of emigrants, and are expected to be finished before June of next year.

BRITISH ENGINES IN INDO-CHINA.—J. W. Brooke & Co., Ltd., of Lowestoft, despatched a number of their well-known marine engines to this district during 1928, ranging up to 28 h.p., the latest being one of their new model " Empire " four-cylinder engines for installation in a launch building at Saigon.

AMERICAN VESSEL BUILT IN HONGKONG.—A vessel built by a local firm of shipbuilders figures among the departures from the port to-day. This is the s.s. *Naga*, built by the Hongkong and Whampoa Dock Co., Ltd., for the Manila Railroad Company of the Philippine Islands.

Launched in January, the s.s. *Naga* is a vessel of 369 nett tonnage while her dimensions are: Length 160 feet, beam 35 feet and depth 13.6 feet. She is leaving Hongkong for Manila in ballast under the command of Capt. Alfreda Suabitta and flies the American flag.

It is understood that the owners intend putting her on a run along the east coast of the Philippines to connect two portions of their railroad but no particulars are yet available.

PUBLIC WORKS

BRIDGE PROJECT IN KEDIRI, JAVA.—Tenders will shortly be invited for the construction of a bridge 380 meters in length across the Kali Brantas River, south of the town of Kediri, Java, according to Trade Commissioner Thomas C. Barringer, Batavia. Tenders will also be invited for the erection of residences on the Koemir sugar plantation. Both these tenders will be executed for the account of the " Handelsvereeniging Amsterdam," 162 Voorburgwal, Amsterdam, Netherlands, and the costs are estimated at several millions of guilders (par value of guilder is $0.402).

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

JAPAN AND CHINA AT PEACE

THE CONSTRUCTION PROGRAM OF THE MINISTRY OF RAILWAYS
By Y. S. CHUN

THE POTENTIAL EARNING POWER OF THE CHINESE GOVERNMENT RAILWAYS

DR. J. A. L. WADDELL'S MEMOIRS

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The Construction Program of the Ministry of Railways

Photostat 147-148 Negative

By Y. S. Chun, Director of the Department of Planning and Construction

IN Dr. Sun Yat Sen's economic program, railway construction is put foremost of all other undertakings. Some of our readers may still remember that he resigned from the presidency in favor of Yuan Shi-kai to take up the post of Director General of the national Railway Corporation in 1912. In his late years of intense activities, he did not neglect to give to Kuomintang a comprehensive economic program, in the "The International Development of China." The National Government is now endeavoring to carry out this most important part of his program through the Ministry of Railways.

The Ministry of Railways was duly inaugurated with Mr. Sun Fo as Minister, and began functioning November 1, 1928. Just before taking up the portfolio, Mr. Sun Fo submitted his proposal of the *Principles of Reconstruction* to the Central Political Council. It was passed at the 162nd. session of the Council and handed over to the National Government for execution. It called for, *inter alia* the construction of 20,000 miles of railway in the course of ten years, or an average of 2,000 miles every year.

Early this year the next step was taken when Minister Sun Fo submitted to the State Council his railway construction program with financing schemes based on the return of certain Boxer indemnities and the expected increase of Customs revenue from the new tariff. This construction program contains four groups of lines arranged in the order of their construction is as follows :

Sun Fo, Minister of Railway

THE PROPOSED CONSTRUCTION PROGRAM

Group 1.—	Shiuchow-Chuchow Section, Canton-Hankow Line	270 miles
	Tungkwan-Lanchow Section, Lung-Hai Line	657 ,,
	Tsangchow-Shihchiachuang Line	138 ,,
Group 2.—	Nanking-Changsha Line	615 ,,
	Nanking-Canton Line	1,212 ,,
	Shiuchow-Nanchang Line	503 ,,
	Foochow-Nanchang Line	523 ,,
	Canton-Yunnan Line	1,313 ,,
	Changsha-Yunnan Line	1,100 ,,
Group 3.—	Paotou-Ningsha Line	344 ,,
	Chengtu-Chungking Line	324 ,,
	Taokow-Tsinan Line.	182 ,,
	Tatung-Puchow Line	510 ,,
Group 4.—	Paoching-Chinchow Line	751 ,,

N. B.—In Group 2, The Shiuchow-Nanchang and Foochow-Nanchang Lines together constitute an alternative to the Nanking-Canton Line, and the Changsha-Yunnan and Paoching-Chinchow Lines of Group 5, an alternative to the Canton-Yunnan Line.

The above lines total between 5,378 and 6,103 miles depending on the choice between the alternative lines, and the construction cost is estimated to vary from $751,521,000 to $863,329,000. To supply a portion of the estimated cost so as to enable the work of construction to start as soon as possible, two kinds of railway construction bonds were proposed, one to be secured on the returned Boxer indemnities of Russia, Italy and Great Britain and the other on the increase of Customs revenue from the new tariff enforced February 2, 1929. Their chief points of interest may be seen from the following table :

NATIONAL GOVERNMENT RAILWAY CONSTRUCTION BONDS

Kind 1	Security Boxer Indemnity	Face Value $135,000,000
	Term 18 years	Interest 7%
Kind 2	Security Customs	Face Value $300,000,000
	Term 25 years	Interest 7%

It is expected that in six years' time from the first issue of the above bonds, the actual proceeds from their sale, together with the indemnity remittances up to the end of 1928, will amount to $408,500,000, which sum will be sufficient for the construction of about 2,500 miles of railway.

The above program was brought up at the Central Political Council, which referred it to three Committees for examination : one headed by Mr. Li Shih-tseng to report on the indemnity bond scheme, one headed by Mr. T. V. Soong on the Customs bond scheme, and one headed by Marshal Feng Yu-hsiang on the construction program. The Third Committee finished their deliberations on February 6, and the program as amended by them and adopted by the council is as follows :

AUTHORIZED CONSTRUCTION PROGRAM

Group 1.—	1.	Shiuchow-Chuchow Section, Canton-Hankow Line	270 miles
	2.	Tungkwan-Lanchow Section, Lung-Hai Line	657 ,,
	3.	Tsangchow-Shihchiachuang Line	138 ,,
Group 2.—	4.	Nanking-Changsha Line	615 ,,
	5.	Changsha-Yunnan Line	1,100 ,,
	6.	Paoching-Chinchow Line	751 ,,
	7.	Tatung-Puchow Line	510 ,,
Group 3.—	8.	Paotou-Ningshia Line	344 ,,
	9.	Chengtu-Chungking Line	324 ,,
	10.	Taokow-Tsinan Line	182 ,,

	11. Shiuchow-Nanchang Line	.. ..	503 miles
	12. Foochow-Nanchang Line	.. ..	523 ,,
Group 4.—	13. Nanking-Canton Line	.. ..	1,212 ,,
	14. Canton-Yunnan Line ..	.. ..	1,313 ,,
	15. Chungking-Liuchow Line	.. ..	

Function of the Projected Lines

The Shiuchow-Chuchow Section (No. 1 on the program) is to supply the missing link of the Canton-Hankow Line, which together with the Peiping-Hankow is a trunk line extending north and south through the heart of the country. It will enable the coal output of Hunan to reach southern industrial centers. The Tungkwan-Lanchow (2) and the Paotou-Ningsha Lines (3) are extensions of the Lung-Hai and the Peiping-Suiyuan lines respectively, serving to encourage colonization of China's great Northwest. The Tsangchow-Shihchiachuang Lines (3) will facilitate the exportation of the famous Shansi coal. The Nanking-Changsha Line (4) will provide an outlet for Pinghsiang and Pohloh coal, and with the Changsha-Yunnan Line (5) form a trunk line joining the southwestern provinces to the capital. The Nanking-Canton and the Canton-Yunnan Lines (13 and 14) constitute another such line following a more roundabout route *via* the coastal provinces, which are more advanced than the rest in commercial and industrial development. The Paoching-Chinchow Line (6) is a complementary line to the Changsha-Yunnan leading to the southern sea-port, and in conjunction with the Chengtu-Chungking (9) and the Chungking-Liuchow Lines (15) taps the products of China's largest province—Szechuen. The Tatung-Puchow Lines will give Shansi Province its main artery of transportation and make it practicable to move its coal toward the west. The Chengtu-Chungking Line besides functioning in the way mentioned is to serve as the start of the Hankow-Szechuen Line, the completion of which is to be deferred to a later construction program. In the meantime, this line will give Szechuen easier access to its most important river port. The Taokow-Tsinan Line (10) will provide an outlet to the East for the anthracite coal of Honan. The Shiuchow-Nanchang and the Foochow-Nanchang Lines (11 and 12) will supply the need of better interconnection between the central and southern provinces.

The Question of Finance

Messrs. Li Shih-tseng and T. V. Soong have not yet reported to the Central Political Council on the indemnity and Customs bonds. But the future of railway construction was assured on March 24, 1929, when the Third National Congress accepted in principle the Central Political Council's *Proposal to Appropriate Definite Funds for Economic Reconstruction during the period of Political Tutelage*. This proposal which may be considered as a further step toward realizing Dr. Sun's program is summarized as follows :

1.—One half of all the revenue of the country to be appropriated for economic reconstruction.

2.—One half of the revenue of the Central Government to constitute the National Reconstruction Fund, which will be employed by the government in developing railways, highways and other means of communication ; coal, iron and other key industries ; conservancy, irrigation and reclamation work ; colonization of undeveloped parts of the country.

3.—One half of the provincial revenues to constitute Provincial Reconstruction Funds, which are to be employed by the provincial governments in developing provincial highways and other means of communication ; city improvements ; conservancy, irrigation and colonization of undeveloped parts of the provinces ; improvement of agriculture.

4.—For the next five years, one half of the National Reconstruction Fund is to be applied to railway construction, and one half of the provincial funds to the improvement of agriculture, the rest to be apportioned among the other undertakings mentioned

5.—A Supreme Economic Council will be established in the National Government to centralize planning of economic reconstruction ; membership of the council to include experts from the party and those from the foremost of their profession in the world.

The proportion of revenue to be devoted to reconstruction, and of this the part to be employed for railway construction have been accepted as standard by the Congress, but the actual amount will, of course, depend upon the national budget.

Work Being Done on Projected Lines

The Tungkwan-Lanchow Section of the Lung-Hai Line has already been making steady progress westward from Tungkwan with Sian as the immediate goal. The work is in the charge of the engineering staff of the Line.

Construction of the Shiuchow-Chuchow Section of the Canton-Hankow Line is entrusted to Mr. S. S. Chuck, who has been appointed chief engineer. Graduated at Stanford University, Mr. Chuck has a brilliant record extending over almost twenty years. For a long time he had an engineering and construction business in Hankow, and lately he has been in charge of the highway department of Kwangtung Provincial Government. At present he is inspecting the line with Mr. Weir, Assistant to Dr. J. D. L. Waddell, Consulting Engineer to the Ministry of Railways, prior to starting the work of construction.

Reconnaissance survey has already started on the Nanking-Canton Line with two parties on the field. One with F. K. Sah in charge will survey the northern part of the line from Yenping to Nanking including the Foochow-Yenping and the Hangchow-Changshan branches. The other headed by H. A. Panhoe will survey the southern part from Yenping to Canton, including two branches also, the Amoy-Lungyen and the Swatow-Meihsien. Mr. Sah is well known as chief engineer of the Kiaochow-Tsinan Line, from which he has been "loaned" to the Ministry of Railways for the duration of the survey. Ever since his graduation from Purdue University in 1910, he has been constantly in railway service. Starting as student engineer in the southern section of the Canton-Hankow Railway, he next worked as district engineer in the I-Kwei section of the Hankow-Szechuen Railway, and as chief engineer of the Ku-Pi railway, a private line in Yunnan. Then he was commissioned by the Ministry of Communications to survey the Tsangchow-Shihchiachuang Line. During the Kiaochow rendition parley, he was on the expert commission for the appraisal of the Shantung Railway, which he subsequently joined in his present capacity. Mr. Panhoe graduated from University of Illinois in 1913. He had extensive railway experience including survey of the Chuchow-Chinchow Railway. Before joining the Ministry of Railways he has been the Commissioner of Public Works for Canton Municipality and is responsible for the fine road-building in that city.

Two more parties are in the process of organization for the reconnaissance survey of the Changsha-Yunnan and the Canton-Yunnan Lines, and before long will be out in the field.

Economic and Geological Surveys

In the past, engineers who make reconnaissance survey of projected lines, also gather information on the agricultural, mineral and other products of the territories traversed, from which estimates of probable revenues were made. The Ministry of Railways have introduced a plan whereby this work is entrusted to special survey parties, one to make economic investigations in general and the other to make geological surveys along the lines.

Economic investigation will be made by a party of three on each line. Detailed information is to be obtained at first hand, as far as possible, not only of the nature and quantity of products and imported goods, but also of the existing facilites of transportation, and the economic function of the line projected. Sixteen men with college training have been assigned to this work, and are now undergoing one month's intensive training : every morning in the Ministry of Railways, and every afternoon in the Agricultural college of National Central University, where special courses have been arranged for them on such subjects as crops, forestry, agronomy, vegetables, etc. Toward the end of this month, they will be out in four parties on as many different lines.

Geological survey of the lines is not only important from the economical point of view on account of the mineral resources that may be opened up, but also from the scientific points of view, because very little is known of the geology of the territory concerned, *viz.* the southern and southwestern provinces where surveys will now be made. A special arrangement has been made by the

Ministry of Railways with W. H. Wong, director of the National Geological Survey, for the sending out of a number of competent specialists, and with Dr. V. K. Ting, a well known authority on geology, for organizing a party.

The National Geological Survey is one of the oldest scientific institutions operated by the government, having been founded more than twenty years ago mainly through the efforts of Dr. V. K. Ting. It has concluded extensive surveys, mainly in North China, and made detailed studies of coal fields in North Manchuria and Shantung, and of earthquakes in Shensi and Yunnan. Its reports and publications have been noteworthy contributions to science, and its staff under the leadership of Dr. Wong is a group of able and enthusiastic men prominent in their profession. Some of them have already been sent out on the new lines : H. S. Wang and C. Y. Li to the Nanking-Canton Line and H. C. Tan and S. W. Wang to the Nanchang-Shiuchow Line. A third party is being organized with Mr. C. C. Liu in charge, assisted by Mr. T. F. Hou and Mr. C. C. Tien, to work along the Changsha-Yunnan Line up to Kweiyang. The rest of the line will be surveyed by another party which is now working in Shensi and is proceeding to Kweiyang *via* Szechuen. Dr. V. K. Ting himself, as mentioned already, will join the party when it reaches Szechuen.

The Potential Earning Power of Chinese Government Railways

IN view of the need of better communications facilities for the proper development of China, many schemes have been suggested to extend the existing railway lines. It is interesting therefore to study the past performances of the railways in order to arrive at some approximation of their potential earning power.

Table I. gives the financial results of operation for the years 1915-1925. It can be seen that the average percentage of increase of operating revenue per kilometre of line operated, was between 6 per cent. and 8 per cent., and that even with the partial interruption of railway operation during the years 1924-1925 owing to civil disturbances the average increase, for the entire period was 5.5 per cent. In 1925, the total operating revenue was $120,000,000 or $17,800 per kilometre of main and branch line operated. It is therefore safe to assume that under the present state of development, the existing railways can earn at least $16,500 per kilometre in 1930.

There are at present about 8,000 kilometres of main and branch line and about 3,000 kilometres of loops, sidings and industrial tracks. This length of line should therefore earn a gross operating revenue of $132,000,000 in 1930. This amount should increase by at least 5.5 per cent. from year to year, until the gross operating revenue per kilometre of line reaches the amount of $35,000. Under efficient management, there is no reason why this amount cannot be reached. The Peiping-Liaoning, formerly the Peiping-Mukden Line had a gross operating revenue per kilometre of line of $32,686 in 1922, $39,360 in 1923, $37,684 in 1924 and $32,995 in 1925. Lines like the Peiping-Hankow the Tientsin-Pukow, the Shanghai-Nanking, the Lung-Hai, the Shantung Railways and in fact more than 80 per cent. of the total length of Government Railways operate through territories similar to that traversed by the Peiping-Liaoning line and serve as connecting links between the many commercial centers along their line. An operating revenue of $35,000 per kilometre of line is therefore not unattainable in the course of fifteen to twenty years.

Table I. also shows that the net earnings varies from 43.69 per cent. of the gross revenue in 1925 to 58.80 per cent. in 1919. The average for the years 1916-1920, which were more or less normal years, was 54.98 per cent. and the average for the years 1921-1925, the period when military operations interfered with railway operation to a great extent, was 46.24 per cent. It is therefore a conservative estimate to assume that from 1930 to 1934, the net earnings of the railways will be 45 per cent. of the gross revenue, from 1935 to 1939, 50 per cent. and from 1940 to 1945, 55 per cent.

TABLE I. FINANCIAL RESULTS OF OPERATION, 1915-1925.

Year	Operating Revenue		Per km. of line		Operating Expenses	Operating Ratio	Net Income and Net Profit & Loss Credits or Debits (Excluding interest charges)	Net Earnings	Per Cent. Net Earnings to Total Operating Revenue
	Amount	Progressive yearly increase percentage since 1915	Amount	Progressive yearly percentage since 1915					
	$	%	$	%	$		$	$	%
1915	55,860,513	—	10,477	—	29,514,862	53	Cr. 104,710	26,450,360	47.35
1916	62,671,720	12.35	11,425	9.05	28,842,278	46	Dr. 375,193	33,544,249	53.45
1917	63,873,704	6.93	11,713	5.73	30,040,565	47	Dr. 2,487,566	31,345,573	49.07
1918	77,652,153	11.60	14,195	10.65	34,322,615	44	Cr. 469,635	43,799,173	56.40
1919	82,848,906	10.36	13,884	7.29	38,270,946	46	Cr. 4,140,940	48,718,900	58.80
1920	91,284,221	10.32	15,257	7.81	42,594,035	47	Cr. 3,490,153	52,180,339	57.16
1921	96,450,836	9.53	15,674	6.94	53,967,045	56	Cr. 3,189,746	45,673,537	47.35
1922	96,393,388	8.11	15,854	6.10	55,276,082	57	Cr. 1,473,906	42,591,212	44.18
1923	115,719,619	9.53	17,653	6.74	63,091,359	55	Cr. 3,659,742	56,288,002	48.64
1924	114,383,422	8.29	16,844	5.42	65,605,203	57	Cr. 5,366,129	54,144,348	47.34
1925	119,989,815	7.95	17,818	5.45	68,350,891	57	Cr. 783,350	52,422,274	43.69

The figures and amounts for any year in this table relate only to those railways that submitted their reports for that year. The revenues and expenses of railways still under construction are also excluded from the amounts shown.

Net Earnings = Operating Revenue — Operating Expenses.

+Net Income Cr. } +Profits.
or—Net Income Dr. } —Losses.

The following table shows the probable earnings of the existing railways for the years 1930-1945 as estimated according to the results of past experience shown in Table I. The gross revenue for 1930 is assumed to be $16,500 per kilometre of line, so that the total gross revenue of the 8,000 kilometres of existing line will be $132,000,000. For the first five years it is assumed that gross revenue will increase at the rate of 5.5 per cent. yearly, while for the rest of the period the rate of increase is taken at 5 per cent. At these rates, the gross revenue will reach the amount of $35,127 per kilometre of line in 1945, an amount already shown to be well within the limits of possibility. The net earnings for the first five years is estimated at 45 per cent. of the gross revenue and increases from $59,000,000 in 1930 to $73,000,000 in 1934. For the next five years it is estimated at 50 per cent .of the gross revenue and reaches the amount of $105,000,000 in 1939. For the rest of the period it is estimated at 55 per cent. and reaches the amount of $155,000,000 in 1945. After 1945, it is evident from the table that even taking gross operating revenue as stationary from year to year, the net earnings of the existing railways will exceed $160,000,000 per year.

There can be no doubt that under normal conditions, the future results of operation will exceed the results of the past upon which the estimates in Table II. are based. The years 1915-1925 have seen many disturbances that rather retarded the growth of the railways. With the return to normalcy and with the abolition of likin and the advent of tariff autonomy, trade and industry will surely develop and the railway will share in that development to a great extent. For these reasons, it is very evident that the figures given in the following table rather underestimate the earning power of the railways.

TABLE II.—ESTIMATED NET EARNINGS OF EXISTING RAILWAYS, 1930-1945.

Year	Operating Revenue: % Increase over prev. year	Operating Revenue: Amount	Operating Revenue: Per Km. of main & branch line	% Net Earnings to Total Operating Revenue	Net Earnings
	%	$	$	%	$
1930 ..	—	132,000,000	16,500	45	59,400,000
1931 ..	5.5	139,260,000	17,407	45	62,667,000
1932 ..	5.5	146,919,300	18,365	45	66,113,685
1933 ..	5.5	154,999,861	19,375	45	69,749,937
1934 ..	5.5	163,524,853	20,440	45	73,586,183
1935 ..	5.5	172,518,719	21,565	50	86,259,359
1936 ..	5.0	181,144,654	22,643	50	90,572,327
1937 ..	5.0	190,201,886	23,775	50	95,100,943
1938 ..	5.0	199,711,980	24,964	50	99,855,990
1939 ..	5.0	209,697,579	26,212	50	104,848,789
1940 ..	5.0	220,182,457	27,522	55	121,100,351
1941 ..	5.0	231,191,579	28,889	55	127,155,368
1942 ..	5.0	242,751,157	30,344	55	133,513,136
1943 ..	5.0	254,888,714	31,861	55	140,188,792
1944 ..	5.0	267,633,149	33,454	55	147,198,231
1945 ..	5.0	281,014,806	35,127	55	154,558,143

Some Thoughts Concerning Economics in the Development of China

By Dr. J. A. L. Waddell

[This is the first of a series of memoirs which Dr. J. A. L. Waddell has prepared for the Ministry of Railways and which will be published in the "Far Eastern Review"]

I. Introduction and Fundamental Ideas

HAVING lately been retained as Advisory Engineer to the Ministry of Railways of the National Government of China, and being a bit of a crank on "Matters Economic," whilst traveling from America to this country I conceived the idea of writing a series of short papers on economic subjects, both technical and otherwise, for publication in English and Chinese in the leading newspapers and periodicals throughout the land. At my first conference with His Excellency Sun Fo, Minister of Railways, I broached this idea to him. He immediately gave it his hearty endorsement, especially as I had suggested that each paper, as soon as written, should be submitted to the Ministry for approval or modification before its publication. Later, I made an arrangement with Dr. P. C. Hsieh, Secretary to the Minister of Railways at Nanking, to send him all of the papers under consideration to be approved, translated, and distributed to the press.

Altogether, I have listed nearly a score of topics for treatment. Some of them being technical will not be included in this series, but will be given to one or more of the engineering societies. Probably I shall not find time to cover all the topics during my stay in China, because they are to be prepared out of office hours, and because my official duties are both heavy and extensive, requiring for their satisfactory fulfilment many hours per day.

It is not my intention to try to cover any subject at all exhaustively, but simply to set the intelligentsia of China to thinking on some matters that are fundamentally important for the development and betterment of their great country.

It is urgent that the people of China not only study carefully and thoroughly the principles of economics and political economy, but also that they bring them into practice in their daily lives. Especially is this true in technical work; for most of the developments needed here involve engineering. Unfortunately, engineering economics is a subject that has not yet been effectively treated in print. The literature thereon is not only meager but scattered and hard to find. There are a few theoretical books that are very good, but of practical treatises there are only three or four, one being Wellington's "Economic Theory of Railway Location" and the other my "Economics of Bridgework." Reference to economic problems is occasionally made, more or less at length, in editorials, memoirs, and communications in the technical press.

In my opinion, China is destined, before the expiration of another century, to become one of the most advanced, prosperous, and powerful nations of the world; for she has the population, the mental ability, the patience, and the willingness to work that are requisite for the attainment of these *desiderata*. All that she needs to-day to become thus successful is a well considered and properly directed effort, combined with a thorough and far reaching policy governing all important details in the lives of her people and her dealings with other nations. To attain the acme of national success it will be necessary to develop a spirit of true patriotism and individual unselfishness among the youth of China, and to educate the masses so that eventually everybody will be able to read, write and cipher.

It will also be essential, of course, to provide higher education in all lines of endeavor for those who are specially gifted mentally, as these must be the future leaders in the peaceful economic struggle which China will have to wage with a large portion of the rest of the world. Such a struggle is inevitable and must be anticipated and prepared for. The best evidence of the correctness of this statement is China's history during the last two or three centuries; for most of the leading nations of the world have oppressed her and interfered with her economic progress. It is not unnatural for other nations to look with uneasiness upon the ultimate rise of China to power in world affairs; but an obstructive policy on their part would be illogical and unwise, for every nation which treats her in a really friendly spirit, and not solely and unsympathetically as a business rival, would gain greatly by the interchange of

How Yellow River Bridge of Tientsin-Pukow Railway was Lifted and Repaired for Traffic

By Tsu Y. Chen, B.S, C.E., Assoc. M. Am. Soc. C.E., Engineer, Tientsin-Pukow Railway

In the January, 1929 issue of the "Far Eastern Review" we published an account of the "Rebuilding of the Yellow River Bridge," by Alfred Batson, a journalist who was present in Tsinan when the first train went through from Pukow. The present article on the same subject by the engineer-in-charge of the actual work is of such importance, that we reproduce it in spite of the shortness of time elapsing between the publication of the two articles.

General Description of the Bridge

THE Yellow River Bridge is remarkable in having not only an interesting Cantilever Span but also a very great total length of bridge (4,100 ft). It was built in approximately three years, from August 1909 to October 1912, by The Maschinenfabrik Augsburg-Nurnberg of Germany.

The Bridge consists of nine spans of 91.5m (300 ft) each, and a three-span Cantilever structure with Anchor Span of 128.1m. (420 ft) and a Cantilever Span of 146.7m. (540 ft). Eight of the simple spans are on the North bank and one on the South bank. The cantilever structure is level, but the approach spans are on a grade of 1:150. The rail level is about 8 meters above the high water mark and 12 meters above the normal water level.

The Bridge is intended to carry two standard gauge railway tracks, but only one is laid at present, being placed in the center of the Bridge with footways along each side. The trusses are designed for only one track, and, when the other track is required, duplicate trusses are to be added outside of present ones, suitably connected to the old trusses.

The superstructure consists of trusses of subdivided Warren type with parallel chords, except the top ones over the main piers are curved to get extra depth. The proportioning of the cantilever span is designed in such a way that each cantilever arm is one-sixth of the span length (90 ft), the suspended span, therefore, is two-thirds the cantilever span or 360 ft.

The depth of the river with its very rapid current, the soft alluvial bottom and the variable water levels, combined to make the structure difficult to erect during the early stage of construction. Undoubtedly, the Bridge represents one of the most notable engineering works in the system of Chinese Government Railways. The general features of the Bridge can be seen from Figs, 1, 2 and 3.

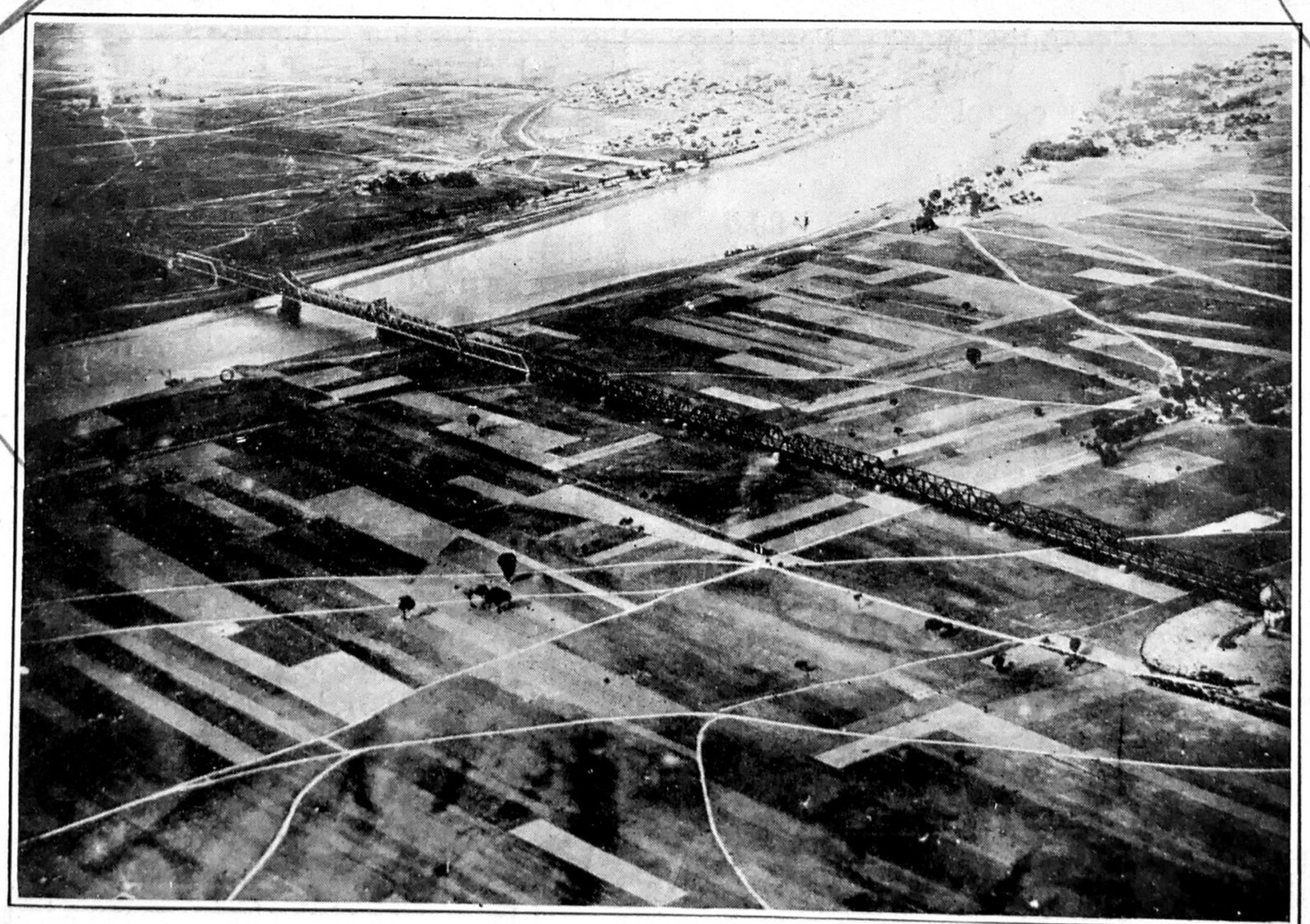


Fig. 1.—Aerial View of the Yellow River Bridge

Brief Account of Damaged Conditions

The attempted destruction of the Bridge was made by the retreating soldiers of the Chili-Shantung Army on May 1, 1928, at about 1.00 p.m. The destructive agent, supposed to be gunpowder detonated by electricity, was placed on the pier carrying the Anchor and Simple Spans on the North bank of the River. The floor system in the end panels of the said spans were totally wrecked. Four pedestals, bearing the superstructures, were entirely destroyed and scattered in all directions only remnants being found on the pier top. End posts and lower chords were damaged and flared outwards and partially left supported on the pier.

Levels have been taken along lower chords of the east and west trusses of the damaged spans, showing that the Anchor Span, with its fulcrum at the central pier, sloped downwards 1,184 mm. in east and 1,179 in west towards the North end, and the North cantilever arm tilted 230 mm. above normal level at the point where the suspended span connects, resulting an abnormal opening of the joint with a pin plate sheared off. The south end of the adjacent damaged simple span dropped 1,345 mm. in east and 1,637 mm. in west, and its north end, being on rollers, moved bodily about 80 mm., pushing against the fixed end of another span. Beyond the damaged end panels the dropping of both spans conformed into an even grade with little deviation from a straight line. (see Fig. 4). This shows that the rigidity of the structure has not been greatly impaired. There was, however, a vertical twist on the simple span as the two trusses did not drop to the same extent, being greater on the west than on the east. Consequently, the riveted joints of protal frames and wind bracings have been loosened.

As a result of explosion, the alignment of both damaged spans has been disturbed. The simple span has been swung horizontally into a position that gives 15 mm. deviation toward west at north end, and 65 mm. deviation toward east at south end. This bodily

Fig. 2.—Cross Section of the Bridge

shift of span must have been attributed to the movable nature of the roller bearings at its north end. The north anchor span received much less disturbance than the simple span on account of its rigid connections at the tower post.

After the explosion on May 1, Railway Engineers hastened to the bridge site taking measurements and photographs for a preliminary report, but the incident of May 3,* prevented them from completing their investigations. Early in September, 1928, a special investigating party of engineers, of whom the writer was one, was sent by the Railway Administration. Their report of the investigations into the damaged conditions of the Bridge was submitted to and met the approval of the Ministry of Railways for the plans of lifting and repairing of the structure.

Lifting and Repairing of the Bridge

Foundations :—The region is entirely alluvial. The stream is notable for its shifting character. During dry seasons, the width of the River is practically confined under the cantilever span, but in flood times from July to September, the water spreads out over the total width between the high water dikes. The clearance between lower chord of Bridge and river bed is varied from 7 to 8 meters. Hard, tough clay is only reached from 55 ft to 65 ft. below lower water level. Therefore the foundations, bearing the temporarily jacking supports or sleeper stacks for the manoeuvering of jacks and carrying timber bents, were prepared in such a way that piling is not resorted to. Experience shows that compacted lime, sandy clay and gravel foundations with a depth of one meter will safely sustain a load of 2,000 lbs. per sq. ft. until next flood.

Weight of Bridge :—This bridge has an unusual feature of short length of cantilever arm in comparison with anchor arm. This eliminates the anchorages required at the piers carrying the ends of cantilever system. On account of this, the bridge was saved from serious damage due to the explosion on the ill-fated pier, otherwise the whole channel span might have dropped into the river. Structurally, this bridge is too squat for aesthetics and the proportioning of truss depths is far too small for economy. The amount of metal is rather extravagantly used.

From data on hand, the weight of Bridge plus track is 9,000 kg/m. for anchor and cantilever arms, and 8,700 kg/m. for suspended span. This makes the reaction at central pier 714 tons per truss and that at the end of anchor span 224 tons per truss.

Lifting Appliance :—Jacks of high capacity such as hydraulic or oil jacks enough to raise the dropping spans in single unit are not available except at great cost. In addition, experience shows that hydraulic jacks of high capacity are difficult to manoeuver and liable to accidents, while screw jacks, seldom if ever designed to lift more than 100 tons in single unit, are more reliable and easier to handle. Screw jack was chosen in preference to hydraulic, after a number of inquiries. Ten 100 ton and four 50 ton Joyce jacks were ordered from United States.

Provision at Points of Suspension :—Owing to the dropping of anchor span due to explosion, the cantilever arm was tilted with its fulcrum at center pier, causing an abnormal opening of joint where the suspended span connects. Pin plates and diaphragms were sheared off and bent. By further investigations, it is found that this does not constitute a state of danger as the load from the suspended span is transmitted through pendulum posts to the hangers of cantilever arms, and the pins are not designed to carry any load other than their specific purpose during erection. When lifting is applied under the anchor arm, the suspended span is supposed to return to its original position automatically. However, as a safety measure, two provisions have been devised at the points of suspension.

The first provision is by using $\frac{3}{4}$-in. diameter steel wire rope wound around the pin and a set of castings put against the bracket, which was originally provided for erection purpose inside the top chord of suspended span. The second is a Yoke device of I beam frame driven tight against the rocker casting of pendulum post with steel wedges. Both these provisions were designed for the same purpose and served to guide the closure of suspended span during the lifting of the anchor arm by tightening the wire rope in one and hammering the steel wedges in other.

Provisions for Maintaining Traffic :—The length of the Bridge and the great depth of the river combined to put the building of a temporary siding out of consideration. The possible solution to maintain a regular traffic is to let the trains run on the damaged spans with provisions that permit repairs be carried on with little or no obstruction, at the same time, the safety of structure kept uninjured. This resorted to a scheme that train load on its portion of the damaged spans be carried temporarily by a system of framed trestle bents, erected underneath the floor beams.

Although the exact nature of the distribution of stresses is rather uncertain, but it is quite sure that when the live load reaches these panels, the floor beams will first pick up and transmitted to the framed bents, leaving probably a very small portion to pass on to the main truss. The arrangement of bents is shown in Fig. 5.

For the end panels of both spans, the wrecked floor system have been removed, and three units of temporary stringers supported on timber bents were erected in its stead, leaving plenty of working space for the remodelling of damaged pier.

* The conflict between Chinese and Japanese troops in Tsinan

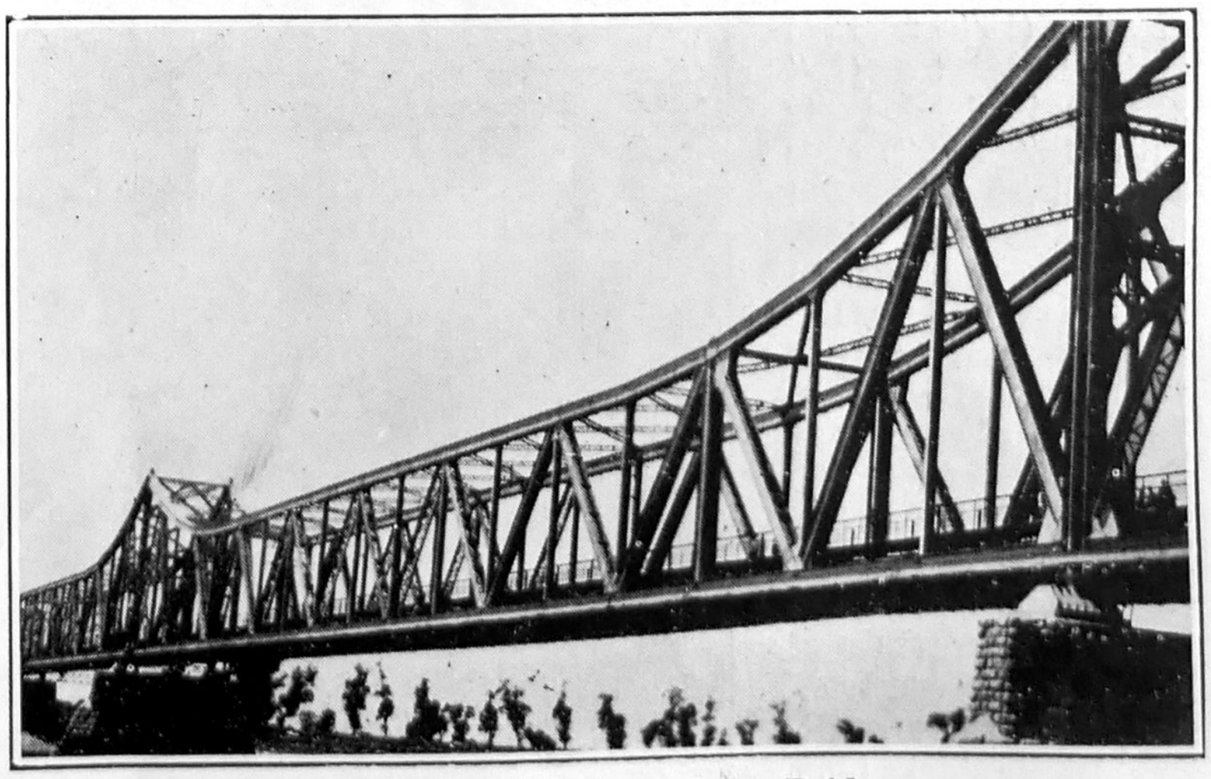


Fig. 3.—Side View of the Bridge

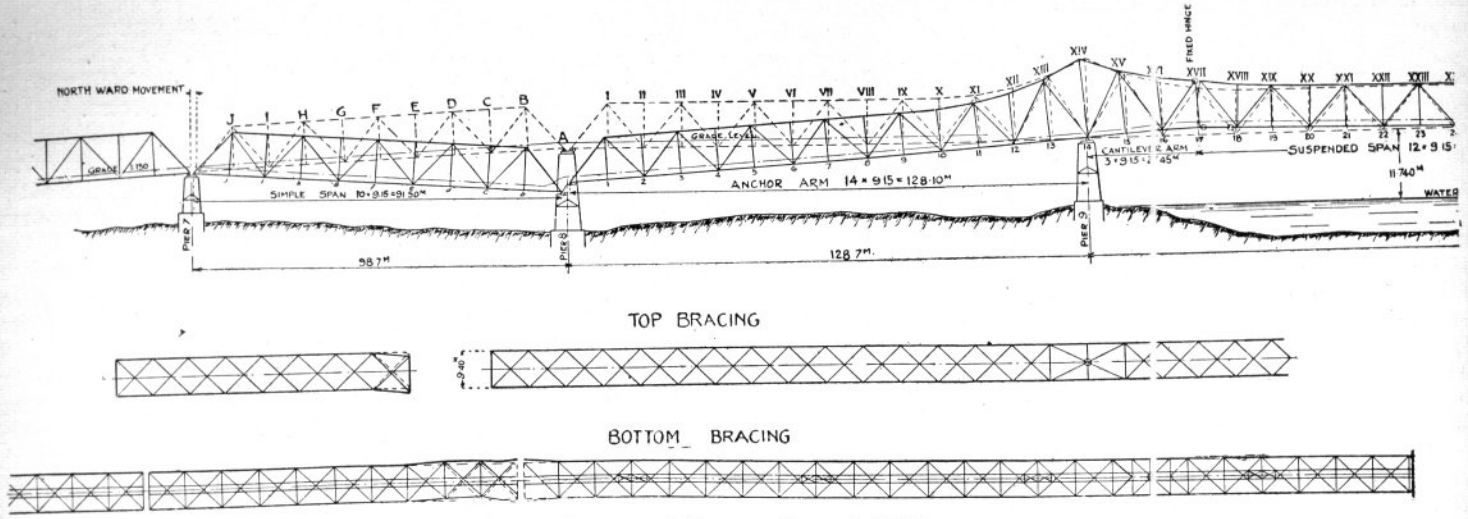


Fig. 4.—Diagram of Damage Done to Bridge

All framed trestle bents were about five meters high, consisting of three vertical and two slanting posts, one cap and one sill, all of 12″ by 12″ Oregon Pine, well braced diagonally by 12″ x 3″ planks. There were 19 bents erected and seated on sleeper stacks, whose height made to suit the underneath clearance between the floor beam and river bed.

These timber bents were not only used to carry the live load under traffic, but served as braces to ease the strain on the jacks during lifting. As the bridge was slowly lifting up, a fraction of a millimeter at a time, these traffic bents were also raised, by the addition of more sleepers underneath or inserting hard wood wedges in between floor beams and caps.

Jacking Supports:—Directly on each side of the damaged pier, four jacking supports, of heavier construction than the traffic bents, were erected upon compacted lime, sandy clay and gravel foundation. They were designed to take full dead load reaction of 272 tons plus one panel concentration of live load of 75 tons when the bridge is under traffic. The framed work consisted of six (16″ x 12″) vertical and ten (12″ x 12″) inclined posts with (12″ x 12″) caps and sills, well braced with diagonals and ties. They were mounted on a tier of 12″ x 12″ timbers and topped with a row of 250 mm. I beams, on which rest the battery of four 100 ton Joyce Jacks (see Fig. 6).

In addition to the jacking supports of heavy frame construction, there were auxiliary sleeper stacks built close to the damaged pier. A single unit of 100 ton jack or a pair of 50 ton jacks was placed on top of each, working simultaneously with the main lift. This served to support the overhanging portion of damaged span, and relieve considerably the stress in the joints.

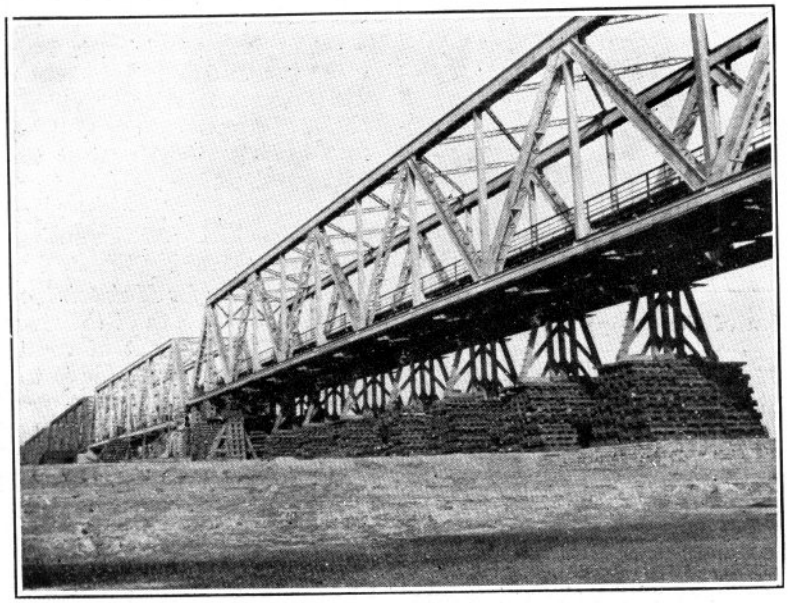


Fig. 5.—Arrangement of Traffic Bents

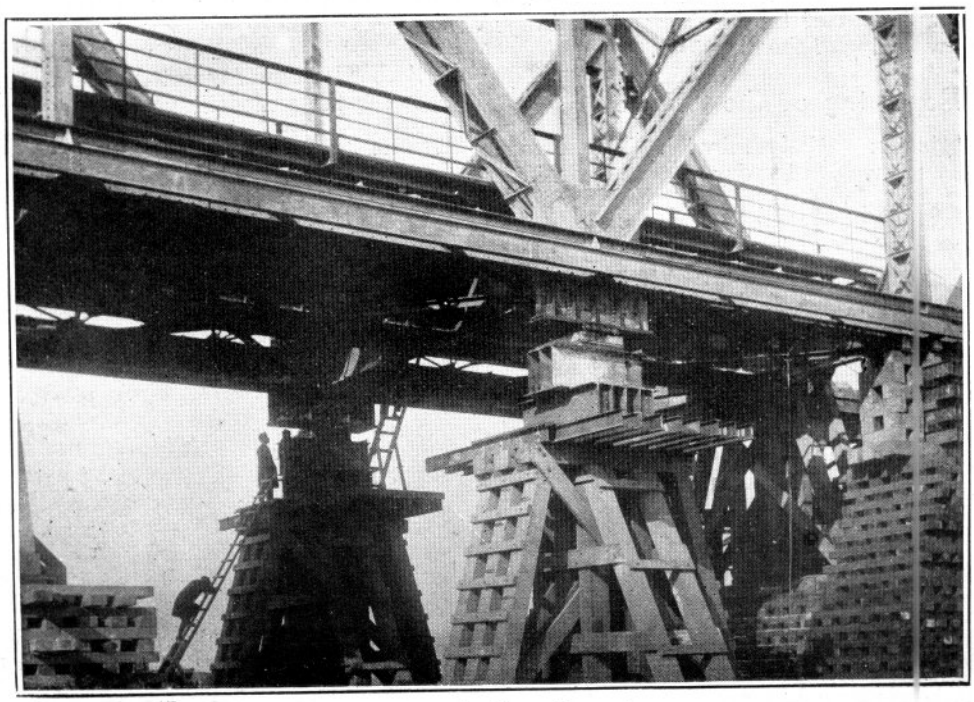


Fig. 6.—Jacking Supports

Lifting Operations:—The work was planned after a number of rehearsals. Signals, whistles and distribution or working force were all prearranged. When order was given for the starting of jacking, the cheering songs of workmen kept the timing of strokes in manoeuvering the jacks, winding the wire rope (at the point of suspension) and hammering the wedges (at the tops of traffic bents). This scene resembles very well of conducting a large symphony orchestra; everybody is working harmoniously with others. There was not a single case of discord reported nor a single accident happened.

The lifting of bridge was about 8″ to 10″ per day while the actual time spent on jacking only two or three hours. The rest of the day was spent in building up the staging, raising up the traffic bents (or braces), rearranging the grillages and resetting of jacks for next operation.

Instrument men have been stationed in proper place to record the raising of span, and give signals if there is any difference of level between east and west trusses. The difference was corrected by regulating the rate or range of strokes in manoeuvering the jacks. A system of grillages, varying from standard rails to 750 mm. I beams, was used to support the jacks

during the lifting or carry the weight of bridge when jacks are entirely removed.

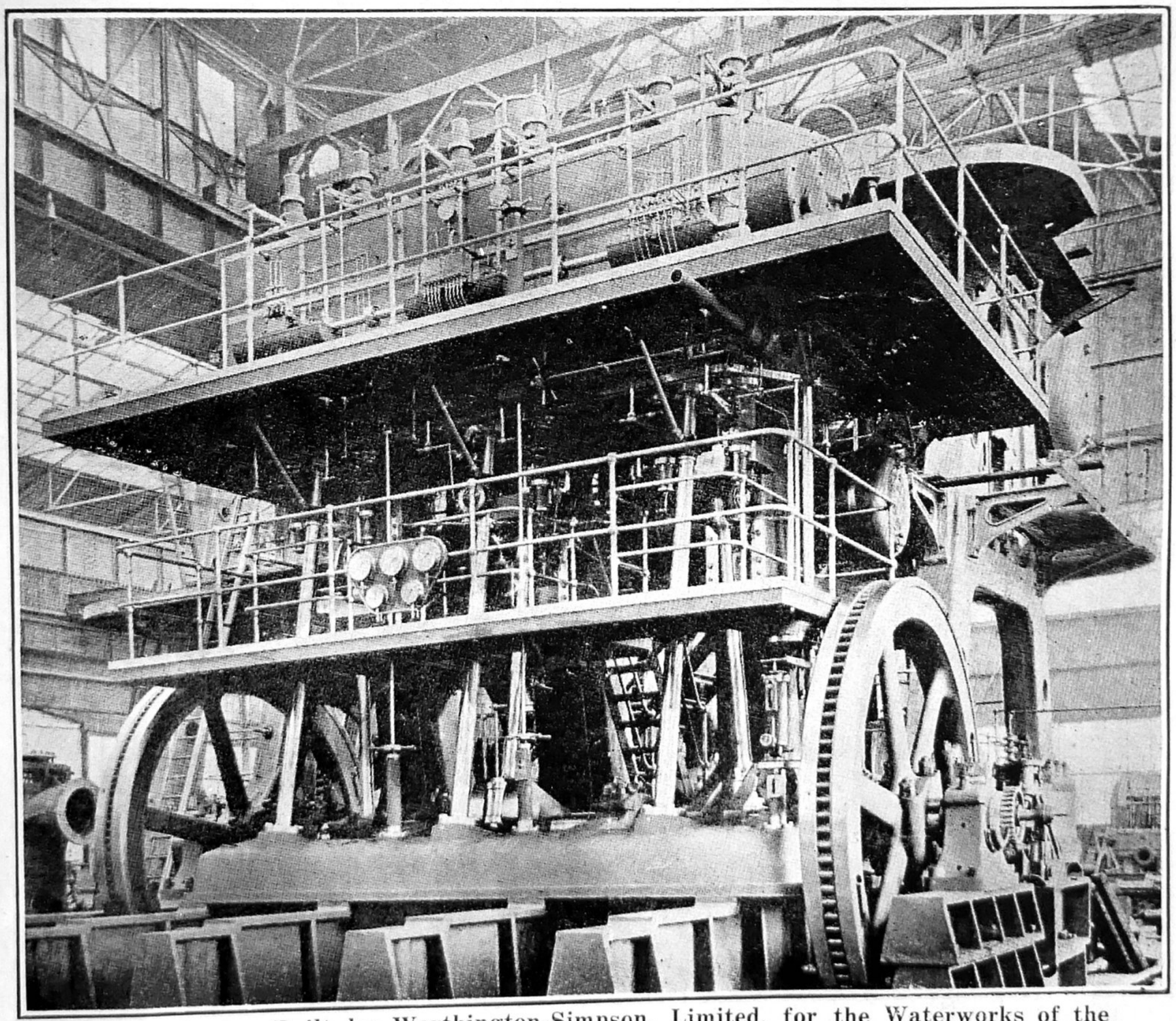
The question of temperature effect was also under serious consideration. Record shows that the anchor span will expand or contract at rate of 1.5 mm. per degree C. The range of temperature for which the bridge was designed is from—30° C to 50°C with 10° C as normal. The total movement of bridge will, therefore, be 120 mm. from extreme cool to extreme hot weather. This will certainly exert a tremendous amount of strain to the temporary timber frames, although such worst case is seldom if ever happened. It seems that some sort of expansion bearings must be provided at the tops of main supports. As mentioned in previous pages, the various units of original roller castings, which carry the anchor span, were all blown off the pier and scattered in all directions. Those odd ends were collected from the River bed and reshaped in the Railway Shop, forming an excellent expansion bearing as shown in Fig. 6.

The lifting of damaged simple span proved to be much easier as it was lighter than the anchor span. However, there was a vertical twist with horizontal shift to overcome. The former was gradually levelled by giving two strokes on west side and allowing only one on east during jacking. The latter was corrected by working a pair of 100 ton jacks placed horizontally against the fixed pedestals of the adjacent span.

The whole work was carried out entirely with Railway construction equipments, materials and labor at an estimated cost of $58,600.00. It is possible that the cost may be reduced greatly if salvage values of timbers and sleepers are taken into consideration. This temporary repair was completed in 34 days from December 17, 1928, to January 19, 1929. The structure was opened to traffic on the following day and found to be quite satisfactory with negligible settlement.

The order for 60 tons of new structural steel parts @ G.$131.50 per ton and 10 tons of cast steel @ G.$171.50 per ton was placed recently with the original manufacturer in Germany. The permanent repair was pending until the arrival of new parts. It is believed that it will be finished before the end of June, 1929.

Personnels :—The design and construction of the work were under the direct supervision of Railway Engineers. H. T. Wu, Engineer-in-Chief; A. R. J. Hearne, District Engineer-in-Chief; the writer, Tsu Y. Chen, Engineer-in-Charge of the work; M. H. Koo, Y. P. Chu, C. L. Nei, L. H. Chow, Y. K. Sun, Assistant Engineers.



Pumping Engine Built by Worthington-Simpson, Limited, for the Waterworks of the City of Howrah, India

An American Equipped Pumping Station in India

FIFTEEN miles up the River Hoogly at Serampore is located the waterworks pumping station supplying the city of Howrah, on the left bank of the river opposite Calcutta, which is the center of the jute manufacturing industry in Bengal.

Since 1903 this municipality has been supplied with water by a Worthington horizontal triple expansion direct acting pumping engine. This unit is still giving good service, but with the need for added facilities the city engineers again turned to Worthington with their problems and last year purchased the vertical triple expansion unit which is shown here.

Details of this plant may be of interest to our readers. The steam cylinders measure 14 inches, 26 inches and 42 inches, respectively, in diameter; the pump plungers have a diameter of 17½ inches, and the stroke is 36 inches. At a speed of 39 r.p.m. this pump will deliver 3,500 Imperial gallons per minute against a total head of 200 feet. Steam is supplied at a pressure of 200 lbs. per square inch with 200 degrees F. superheat. Under these conditions the unit has a steam consumption of only 10.9 lbs. per indicated horsepower per hour.

This equipment was manufactured and supplied, with boiler and auxiliaries, by Worthington-Simpson, Limited, of London, whose works are located at Newark-on-Trent, England.

Engineering Notes

ELECTRIC LIGHT, POWER AND TRACTION

S.M.R. ELECTRICAL SYSTEM.—Before the current fiscal year is over, the South Manchuria Railway Co. is going to build a new power house at Kuochiatien on the S.M.R. Main Line (north of Ssupingkai) and to buy up the power transmitting line between Dairen and Chinchou, owned by Kwantung Government, so as to unify the control of the Dairen-Pulantien Line.

Then, the Company proposes to enlarge the Amanogawa Power House on the Hoshigaura tram line and to undertake supply of electricity to New Wiju across the Yalu from the Antung side for which the agreement has already been concluded.

The Company's plan to unify the electricity system along the S.M.R. Lines is mapped out on a business-like basis and follows :—

Firstly, with Fushun for the base one line will branch out to Mukden, Anshan, and Haicheng, another to run between Mukden and Penchihu, and a third to branch out between Mukden and Tiehling.

Secondly, from the Antung base will run out the Antung-New Wiju line, as stated above, to be extended to the next station on the Chosen Railway. Another line will run from Antung to Penchihu on the Mukden-Antung Line.

Thirdly from the Changchun base will run out a southward line to Tiehling *via* Kungchuling, Kuochiatien, Ssupingkai, Changtu, and Kaiyuan.

Fourthly, from the Dairen base will run out the Dairen-Port Arthur Line and also the Dairen-Pulantien (already in existence) to be extended north to Haicheng.

Fifthly, from the Yingkou base will run out the Yingkou-Tashihchiao line.

JAPAN POWER CO. TO START ACTIVITY IN KOBE.—The Japan Electric Power Company is expected to display its activity in Kobe shortly, as arrangements for the supply of electric power to Kobe consumers, after long negotiations with the Kobe municipal authorities, have been concluded through the courtesy of Governor Cho, of Hyogo Prefecture.

According to the agreement, the Japan Power Company will not supply Kobe consumers directly, but will sell power to the Kobe Municipality, as the Ujigawa Electric Power Company is doing. The total volume to be supplied to Kobe city is limited to 10,610 kilowatts, at the same charge as the Ujigawa Power Company.

The power will be sent to the transforming station, which the Japan Power Company owns in Nikenjaya, to the Fukiai and Minatogawa transforming stations and to other stations which will be purchased by the Kobe Municipality. If the consumption of power increases in future, the Ujigawa Power will supply 60 per cent. for additional consumption and the remaining 40 per cent. will come from the Japan Power Company.

Although the terms of the contract are not yet made public, it is generally considered that it will be valid for five years. The selling price is also not yet announced publicly.

NEW 2,000 KILOWATT GENERATOR.—The Changchun Branch power house of the South Manchuria Electricity Co., Dairen, has a 2,400 kilowatt generator.

Owing to the steady growth of demand for light and power, the capacity of the existing generator has come to be fully taxed.

When the new transmitting lines between Changchun and Kungchuling, now under construction, gets ready, a supply will have to be distributed to not only Kungchuling, but also elsewhere on the same section.

The Company has decided to instal a new generator of 2,000 kilowatts, and has applied for Government permission.

FORMOSAN POWER COMPANIES.—The Taiwan Electric Power Company, Formosa, has decided to absorb the Taiwan Electric Development Company, capitalized at Y.6,000,000, of which Y. 4,449,500 is paid up, an organization under joint investment of the Bank of Taiwan and the electric powe company. The matter will be submitted to its general meeting of shareholders on April 20.

On the absorption the Taiwan Power will increase its capitalization from Y.30,000,000, of which Y.28,200,000 is paid up, to Y.34,449,500.

RAILWAYS

SOVIET RAILWAY IN TURKESTAN.—According to reports published in Russian papers, the Soviet Government has launched a big railroad construction program in districts bordering on Chinese Turkestan. Construction work was started in 1927 and arrangements are now being made for additional railways in that neighborhood, it is stated. Two new lines, one leading from Semipalatinsk to Yamantau, a city situated on the Russo-Chinese border, and another line from Semipalatinsk to Chelyabinsk, an important center still nearer to the Sinkiang boundary, were completed and opened for traffic on December 20, 1928. With the completion of these two railways Sinkiang is practically surrounded on both the northwest and the west by Soviet influence.—*Kuo Min News Agency.*

KWANGTUNG-YUNNAN RAILWAY.—In connection with the proposed Inter-provincial railway line connecting Kwangtung and Yunnan, the Ministry of Railways is dispatching a number of engineers to survey the entire section to be traversed by the line so as to facilitate its early construction. It is learned that the new line will link the districts of Pangpu, Hsiencheng, Nanhai, Samshui, Shiuning, Takhing and Fungchun in Kwangtung, with Tsangwu, Tengyun, Mongkong, Pingnan, Kweiping, Wunsuan, Laiping, Tsienkiang, Tu-an, Tungnan and Hsingyi in Kwangsi, and Loping, Shinonung and Luliang in Yunnan.

SURVEY ON NEW RAILWAY BEGUN.—Surveying of the routes of the proposed Kwangtung-Kiangsi and Kiangsi-Fukien Railways has started at the Nanchang end. The former line, according to the Ministry of Railways, will start from Nanchang, pass through Southern Kiangsi and terminate at Chaochow in Kwangtung to connect with the Canton-Hankow Line ; the latter will start from Foochow, pass through Shaowu and Sankwan in western Fukien, Eastern Kiangsi, and terminate at Nanchang to connect with the Nanchang-Kiukiang Line. In a telegram to General Chu Pei-teh, Chairman of the Kiangsi Provincial Government, Minister of Railways Sun Fo, requests that the surveyors despatched by the Ministry of Railways be given all necessary assistance to facilitate their work.

ELECTRIFICATION OF MAYURBHANJ.—The Maharajah Protap Bahadur Deo of Mayurbhanj State, in the province of Behar and Orissa, has marked his accession by electrifying his chief town, Baripada.

The General Electric Co. (India), Ltd., entrusted with the scheme, has equipped a power station with a 70-k.w. oil engine-driven generator, installed pumping sets, erected over eleven miles of overhead line, and wired the houses. The Governor of Behar and Orissa started up the plant early in January.

TOKAIDO LINE TO BE QUADRUPLE-TRACKED.—Excepting the stretch between Maebara, 68.8 miles east of Osaka, and Numazu, 85.6 miles west of Tokyo, the Tokaido line of the Government Railway, where the traffic is heaviest, will be quadruple-tracked by the end of the fiscal year 1937-38. The project calls for an outlay of Y.45,087,000.

The construction program :

1.—Section between Shinagawa and Tsurumi, will be completed during 1929. To cost Y.700,000

2.—Section between Tsurumi and Hodogaya will also be completed during 1929. To cost Y.800,000.

3.—On the section between Hodogaya and Kozu, the work will commence during this year and will be completed by April, 1934. To cost Y.3,000,000.

4.—On the section between Kozu and Numazu, the work will commence during 1929 and will be completed by April, 1932. To cost Y.8,617,000.

5.—On the section between Kyoto and Maebara, the construction work will commence during 1931 and will be completed by April, 1938. To cost Y.26,180,000.

6.—On the section between Kyoto and Kobe, the work will commence during 1929 and will be completed by April, 1933. To cost Y.5,800,000.

Of the many sections above referred to, the first two—between Shinagawa (Tokyo) and Hodogaya (Yokohama)—are expected to be completed this coming autumn, and inasmuch as passengers and freight will be carried on separate tracks, traffic between these two cities will be handled with considerable efficiency, when the quadruple tracks are completed.

West of Yokohama, the work for doubling the present double tracks will be completed as far west as Hiratsuka during this year. The construction work is now going on between Hiratsuka and Numazu, between Kobe and Osaka, and Kyoto and Osaka.

On the long stretch between Numazu and Maebara, extending nearly 200 miles, the work of quadrupling the tracks will be started when the increase of traffic volume justifies the conversion.

In all probability, the entire stretch of the Tokaido line will be quadruple tracked by the end of 1939.

OSAKA-ISE RAPID ELECTRIC RAILWAY.—The construction of a rapid electric railway, which would connect Osaka and Ise (where there is the Ise Grand Shrine) in about 2.5 hours and Kyoto and Ise in about 3 hours, is making smooth progress, and there is a likelihood of this line being opened to business in about November, next year.

It was in April, last year, that the Sangu Denki Tetsudo K.K., started construction of the line between Sakurai and Uji-Yamada, a distance of 58.8 miles, connecting on its way Hase, Haibara, Inari, Nahari, Matsuzaka, etc. The Sangu is a sister company of the Osaka Electric Tramway Company.

Between Haibara and Matsuzaka, there is a tunnel which is 11,200 feet or about two miles long, but so far, the work has progressed more than one half, about 7,000 feet having been opened.

Upon completion of the line, electric trains consisting of six carriages will run every half hour on a 4.8 feet gauge track operated by 1,500 volts of power. Compared with the fact that the Government Railway at present takes from 5½ to 6 hours between Osaka and Uji-Yamada, the time required by this proposed new line will be shortened to more than one half. As for the passengers coming from the Kyoto district, they are to take the Nara Electric Railway as far as Yagi on the Osaka Electric Railway and change to the new line.

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

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The Problem of Extraterritoriality

By George E. Sokolsky

THE SHANGHAI-NANKING RAILWAY

CHINA'S NEW AVIATION CONTRACTS

DR. WADDELL'S MEMOIRS

10 BALDWIN LOCOMOTIVES FOR CHINA'S RAILWAYS

Vol. XXV May, 1929 No. 5

SHANGHAI, PEKING, TOKYO AND MANILA

JUN 25 1929

The Shanghai-Nanking Railway

Proposed Changes in Working and Loan Agreements

COMPLAINTS with regard to the management of the Shanghai-Nanking Railway, have been made from time to time and a campaign of quarrelsome recrimination was entered upon, the foreign staff accusing the Chinese and the Chinese staff accusing the foreigners of indifference and even corruption. To meet this situation, Mr. Sun Fo, Minister of Railways, appointed a Commission to investigate conditions on the Shanghai-Nanking and Shanghai-Hangchow-Ningpo Railway. The Commission composed of Messrs. T. C. Yen and C. S. Liu, Councilors of the Ministry, Mr. J. K. Choy, Director of the Department of Railway Administration, Messrs. Robert S. Norman, James Lockhart, John M. Weir, advisers to the Ministry, and Dr. P. H. Lo, Member of the Board of Commissioners of the Shanghai-Nanking Line with Dr. T. C. Yen as Chairman. The work of the Commission was to solve the following problems :—

1. Whether in the purchase of coal and other materials, there have been any irregularities and the means of improvements thereof.
2. The causes of delays in traffic and the question of responsibility.
3. Whether the General Manager and the foreign officers are competent, and whether they have over-stepped the scope of their duties, acted without authority, neglected the orders of the Authorities, and other irregularities.
4. Where the Loan Agreement and the Working Agreement need revision, and how they are to be revised so that the best results may be attained.

Having gone through thorough investigation, the Commission made voluminous reports to Minister Sun. The gist of them may be summed up as follows :—

IRREGULARITIES IN THE STORES. The present godowns in the chief store at Woosung are inadequate for the needs of the Railways. Two perfectly good godowns which might be advantageously employed for storage are lying idle for a long time. The weigh-bridge, though available for taking coal deliveries, was not used at all. Instead, a slow and inefficient method of taking coal deliveries by means of baskets was used. That led to a great deal of leakage. No coal yard, suitable for the purpose, exists at Woosung.

For many years before the present administration, only one fine of ten cents per ton was ever levied on the contractors for the supply of coal, although it was very much inferior to the guaranteed standard and originally a fine of $1.60 per ton was recommended. The specifications for coal were not so prepared that local dealers could easily comply with the conditions. The stipulations of penalties, in case of failure to fulfill the specifications were not strictly enforced.

Cases are frequent where irregularities and disobedience of Ministerial instructions obtained in store purchasing. The General Manager even went so far as to ratify an unauthorized and illegal transaction of nearly $200,000 by the late Chief Storekeeper, Mr. Cook. This indicates the extent of slackness on the part of the general Management. The General Manager consistently hampered the purchase of the Da-Qun-Lun coal and took the Fushun coal from Old Yung Chong although the Managing Director's instructions were to purchase the former.

RECOMMENDATION FOR THE STORES.—The Shanghai-Nanking Line consumes annually about 100,000 tons of coal and the Shanghai-Hangchow-Ningpo Line about 80,000 tons. Both together cost more than $2,000,000. The Commission recommended that some arrangement be made whereby coal could be purchased directly from the mines instead of through coal dealers in Shanghai. It found that the Chung Hsin coal seemed to be most suitable from the analyses made because of the location of its mines. But to remove the monopoly of the sale now belonging to the Ta-Lu Coal Company, the Commission recommended to have some arrangement made whereby the loan made to the mines by the company could be repaid, so that the railway may be free to buy directly from the mining company. This would lower the price, make the quality uniform and obtain a steady supply of coal.

It is also recommended that a new system of taking delivery, storing, and issuing of coal should be established to prevent irregularities as much as possible and that once the coal is issued to the engine sheds, it be in the charge of the Locomotive Department instead of still remaining with the Store Department.

IRREGULARITIES IN TRAFFIC.—In traffic matters, the Commission found that the management has persistently evaded its responsibilities. The weigh-bridge of the Railway which has been out of order for a number of years and reports on defective conditions of which have been repeatedly made, stands unrepaired. The reliance on the small scale, in exclusion to weigh-bridges, has made it impossible to have a complete check on the weigh of goods consignments. The investigation revealed a great number of instances of very considerable excess weight over the recorded weight.

Train delays for the past year, from January 1928 to January 1929 were frequent, amounting to 82 per cent. of the total number of trains run. Of these delays 50 per cent. was due to crossing and waiting, 24 per cent. to running slow, and the rest to other causes. The new Railway authorities, had to try to break up the ring by using Shantung coal mixed with that from the Fushun mines. Records show that there had been train delays throughout the year, as well as during previous years, but that they had been aggravated during last January. The causes of these delays are :—

1. Failure of the Store Department to have the coal mixed according to specific proportions.
2. The number of coaches, and sometimes private cars, attached to the train is too great.
3. During the winter months, slippery rails were prevalent.

It is true that the Shantung coal is high in ash and easily clinkers when used alone but this could have been easily avoided if the mixture had been faithfully carried out.

Other irregularities were discovered which reflect on the efficiency of the general management, such as the granting of exclusive rights and special privileges to certain companies to transport specie and parcels. The general management should be held accountable for the responsibilities entrusted to it and more definite regulations should be framed and strictly carried out in order to prevent the recurrence of similar irregularities. Recommendation on the general management will be dealt with separately.

ENGINEERING, THE LEAST UNSATISFACTORY DEPARTMENT.—The present water supply system is very unsatisfactory. The fish-plates are too thin in section to match the 85-lb. rails. The spacing of sleepers is too far apart. Most stations are inadequate to meet the present passenger traffic. The Managing Director has no knowledge of repairing works and new minor work now given to a few contractors who generally monopolize them, nor is he able to keep a check on any capital engineering work in progress.

In the Mechanical or Locomotive Department, it was found that the grate bars now in use for the locomotives are not suitable; that the 52 locomotives of the Railway are not sufficient to meet the demand of traffic ; that there are no machine tools at any of the engine sheds so that when repair work of any kind is required, the engine has to run to the Woosung workshop ; that there is no car repair shop, all car repairs being conducted in the open ; and that the shops at Woosung are very inadequate, poorly equipped and badly located, being at one end of the line.

RECOMMENDATIONS FOR THE ENGINEERING DEPARTMENT.—The Managing Director should be fully informed of any work already or yet to be given out, and has the right to voice his approval or disapproval of any proposed work. Public tenders should be called for making repairs and new works costing over a certain specific amount as set down by the Regulation promulgated by the Ministry of Railways.

Any work on the rebuilding of the Nanking station should be of a temporary nature. The question of removing it to a more suitable location preferably into the city of Nanking should be taken up and dealt with.

Emphasis must be made of the necessity of changing the rigid fire bars of the locomotives to rocking bars so that coal obtainable in the country can be used with efficiency. The change will cost only about $600 per locomotive as estimated by the locomotive Superintendent, and it is to be regreted that this has not been done before. A careful study of the fire box and ash pans should also be made when ordering new locomotives.

Instead of double tracking the Line, the Commission recommended the purchase of more locomotives, the installation in the various engine sheds of sufficient machinery to take care of light repairs, and the building of a car repair shop of up-to-date design so that cars can be repaired under protection against bad weather.

The Commission also recommended the removal of the Workshops and Stores at Woosung to a more suitable place be considered before spending any sum of money on their entension. As Woosung will inevitably develop into a shipping port, the space now occupied by these workshops will be required for traffic purposes and their location is not central enough for efficient use. Strong recommendation on their removal was made.

ACCOUNTING.—This department was found in rather good condition as far as the working of the accounting system in the office is concerned. Since lack of time prevented the Commission to have an intensive study of the organization and its working outside the office, it was recommended that travelling auditors directly responsible to the Ministry be sent to check all accounts in the office as well as in the stations.

UNFAIR TREATMENT IN MEDICAL ATTENTION.—The medical officer, who is a member of a British medical firm, spends very little time on the Railway. Arrangements for Railway in-patients in Shanghai and other localities along the Line are inadequate. Discrimination has been made among the railway employees, the foreign staff being allowed to choose their own hospital and doctors at the Railway's expenses. The medical department, on the whole, is inefficient.

RECOMMENDATION FOR THE MEDICAL DEPARTMENT.—This department, together with its personnel should be completely reorganized. In order faithfully and efficiently to execute his duties, the chief medical officer should be a qualified full-time doctor, preferably a Chinese as he has to do mainly with Chinese employees. A careful survey of all hospitals in Shanghai should be made and the most suitable one selected for Railway in-patients in the locality. All the hospitals and dispensaries including the personnel should be thoroughly surveyed and reorganized when necessary. All Railway employees, regardless of nationality should be accorded the same medical service.

GENERAL IRREGULARITIES.—It has been shown that after investigation of the various departments, the general management has in some respects over-stepped its duties, acted without authority, neglected the orders of the authorities and committed other irregularities, detrimental to the interest of the Railway. The refusal to pay house rent, the taking of privileged leave by the General Manager, the appointment of travelling auditor without the Managing Director's sanction, the reluctance of the General Manager to deal with the Hongkong and Shanghai Bank for loss sustained in connection with stolen and forged checks, and the unhealthy attitude and adverse criticism of the General Manager and the Traffic Manager toward the Ministerial Order requiring the joint signature of the departmental chiefs and the assistant chiefs are singular instances of the General Management's irregularities.

GENERAL COMMENDATIONS.—"In short, the investigation of the Commission discloses a long record of differences between the Chinese and foreign interests of the Railway, which differences clearly impair the efficiency of the service and are as detrimental to those financially concerned in the Railway as they are to the Chinese Government." The Commission believed that these can be largely attributed to the existing Loan and Working Agreements. Although the basic solution lies in the revision of these agreements, the following temporary measures for the improvement of the existing conditions are recommended :—

"1. The office of General Manager should be abolished, as its existence lends to delay and duplication of work, confusion and friction, and the concurrent holding of the office of Engineer-in-Chief and General Manager deprives the Railway of a system of checking so desirable in efficient management.

"2. Such powers as are delegated to the Managing Director to the Board of Commissioners should be clearly defined, so that no question of subjecting his actions to the review of the Board could possibly arise. In case of disagreement between Chinese and British members, the matter should be referred to the proper governmental agencies whose decision shall be final.

"3. The appointment and dismissal of all officials and/or employees of the Railway should be made by the Managing Director, with the exception of the Engineer-in-Chief and Chief Accountant, who may be nominated by the Corporation and appointed by the Managing Director. The title of Engineer-in-Chief should be replaced by that of Chief Engineer, who will be in charge of Maintenance of Way and Works.

"4. All officials and employees should be accorded the same treatment, without any discrimination whatoever.

"5. Joint responsibility for all payments should be accepted by the Managing Director and the Chief Accountant.

"6. The provision in reference to the purchase of foreign materials, the payment of loans by the Railway and the net-profit certificates should be amended.

"7. We are convinced that it is highly advisable to amalgamate the Shanghai-Nanking and the Shanghai-Hangchow-Ningpo Lines, to simplify the control, increase the efficiency and reduce the working expenditure. In order to make this practicable, it is necessary for the Loan Agreements of both Lines to be amended with this object in view."

Minister Sun Fo is giving serious consideration to the recommendations. It is hoped that these suggestions looking forward to a betterment of the administration and improvement in the services of the railways concerned will be carried out at an early date.

The foreigners associated with the management of the Railway have made no statement of their side of the case. Mr. A. C. Clear, the General Manager and Engineer-in-Chief resigned and Mr. I. Tuxford, who had been associated with the Railway, since 1904, has been appointed to fill the vacancy.

China's New Aviation Contracts

American Company to Operate Air-mail Service on Three Routes: to Fly 3,000 Miles a Day: Chinese Aviators to be Trained

THE air-mail contract between the Chinese National Aviation Corporation and Aviation Exploration Inv., is of exceptional importance because it lays the bais for future contracts of a similar nature in China.

In accordance with the basic principle of the National Government a franchise can be granted to a foreign country to operate a public utility as such a franchise might entail questions of sovereignty and of political relationships. In this contract then a means was found for the granting of a franchise. For this purpose, a Chinese Government Corporation incorporated by special Charter of the National Government, namely, Chinese National Aviation Corporation, was created with Mr. Sun Fo, Minister of Railways as its President. This new corporation has entered into

Heavy Trains and Long Runs on the Chinese Eastern Railways

By S. J. Kolpachnikoff in "Baldwin Locomotives."

THE Chinese Eastern Railway runs through the northern part of Manchuria starting from Manchouli Station on the border of Siberia, where it connects with the Trans-Baikalian Railway, and continuing to Harbin and Pogranichnaya where it connects with the Ussuri Railway leading to Vladivostok. The Chinese Eastern Railway, therefore, is practically a connecting link of the Trans-Siberian Railway, making a direct connection between Chita and Vladivostok. The length of its main line is approximately 850 miles and it also includes a branch line, approximately 140 miles long, which starts from Harbin and runs to Changchun where it connects with the South Manchuria Railway.

The Chinese Eastern Railway serves a very large and fertile country which is now thinly populated, but which is rapidly being colonized. It is to be anticipated that this country will, in the near future, have a tremendous development to which the Chinese Eastern Railway, under joint Chinese and Russian Soviet management, will contribute greatly.

Owing to the disturbed conditions in the south of China, constant wars and poverty resulting therefrom, a great number of colonists seek refuge in the northern part of Manchuria and the number of these immigrants is constantly increasing. It is difficult to obtain accurate figures, but it is estimated that half a million people have settled in this territory during the past spring and summer. The families which thus arrive start to work immediately to till the soil and the acreage of farm land is therefore increasing rapidly, which in turn increases the amount of freight handled by the Chinese Eastern Railway, at times taxing its capacity to the fullest extent.

It is interesting to note, therefore, how the management of the Chinese Eastern Railway is meeting this situation by introducing heavy trains and long locomotive runs.

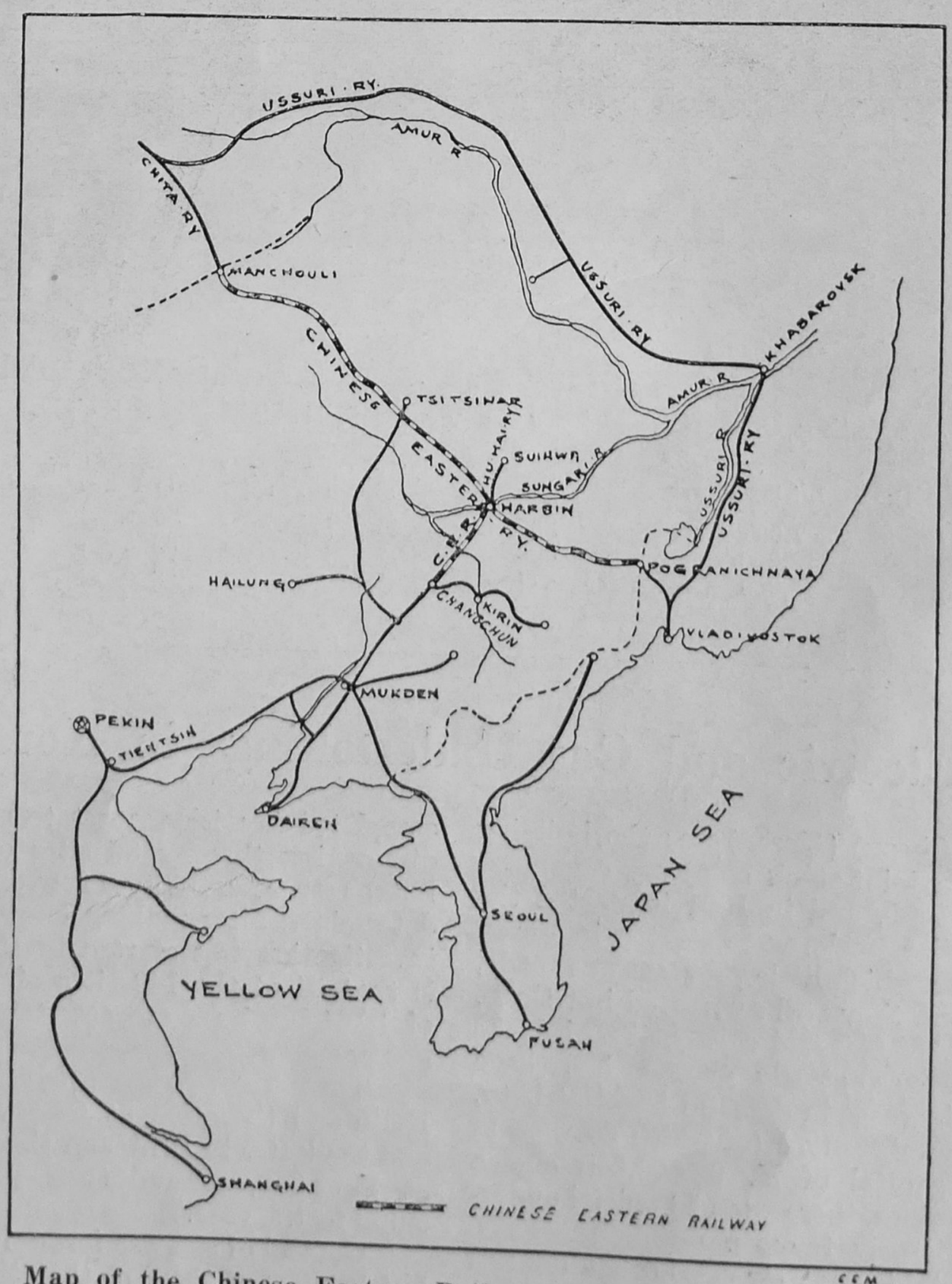
The Chinese Eastern Railway is one of the few railways, built by the Russians, on which American locomotives were used extensively during the construction period. Between the years 1898 and 1903 the Railway purchased from The Baldwin Locomotive Works, 121 Consolidation type, Vauclain Compound, locomotives and 27 0-6-2 type, Vauclain Compound tank locomotives.

The tank engines performed their service faithfully during the construction work of the Railway and the Consolidation type locomotives, for a number of years, took care of all the freight movement on the Eastern Line of the Railway, which runs from Harbin to Pogranichnaya, a distance of 320 miles. This part of the line has heavy grades combined with curves, quite a number of which go as high as 1½ per cent. where, of course, the trains are moved with the aid of pushers. Notwithstanding these severe conditions of operation, the Baldwin Consolidations have rendered very good service, especially during the period between 1914 and 1917, when a tremendous amount of freight, consisting largely of troops and war materials, was moved from Vladivostok and the Ussuri region to the front. As many as fourteen pairs of trains per day were handled during this period and the service of these veteran engines is still gratefully remembered by all the older employees of the Chinese Eastern Railway.

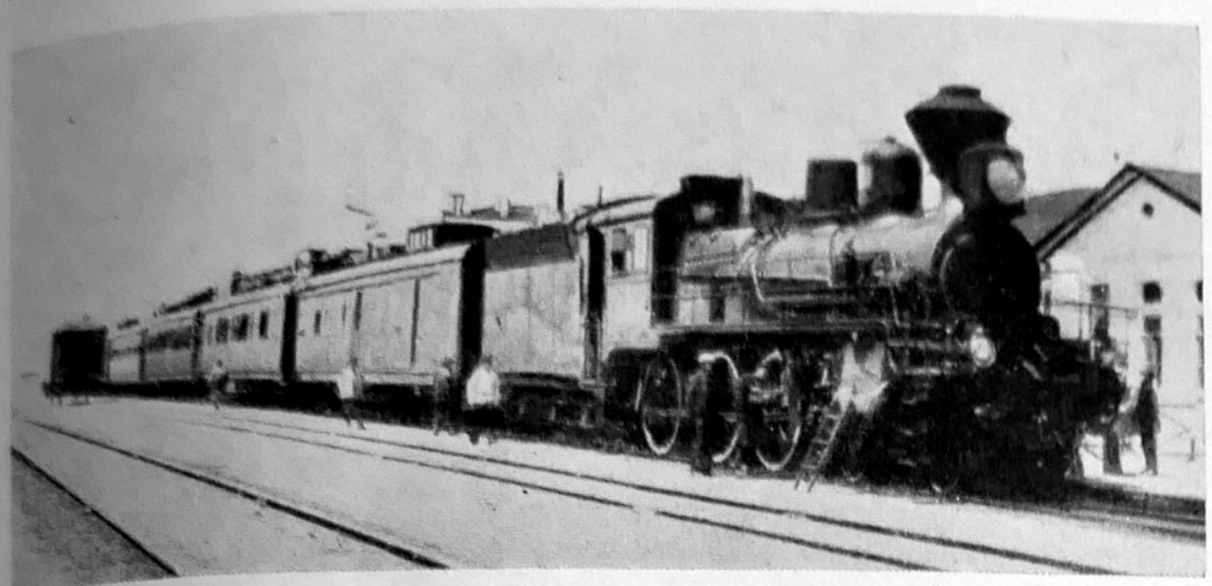
During the same period the Russian Government ordered approximately 900 Decapod type locomotives from the United States, all of which were erected in the shops of the Chinese Eastern Railway at Harbin. The Railway retained 114 of these Decapods, using them to take care of trains, the weight of which had gradually exceeded the capacity of the Baldwain Consolidations.

Between the years 1918 and 1921 these 114 engines were used on the Western Lines of the Chinese Eastern Railway between Harbin and Manchouli, a run of approximately 530 miles. Besides the Baldwin Consolidations, the Railway also had in operation a number of 2-8-0 type freight engines built by the Fives Lille in France, as well as a number built by the Russian Locomotive and Machine Works at Kharkoff and the Brianski Iron Works at Briansk. These Russian-built locomotives of the 2-8-0 type were designated as "Tze" and "Sha" locomotives. The passenger service was taken care of by "Gue" engines of the 4-6-0 type built by the same Russian works.

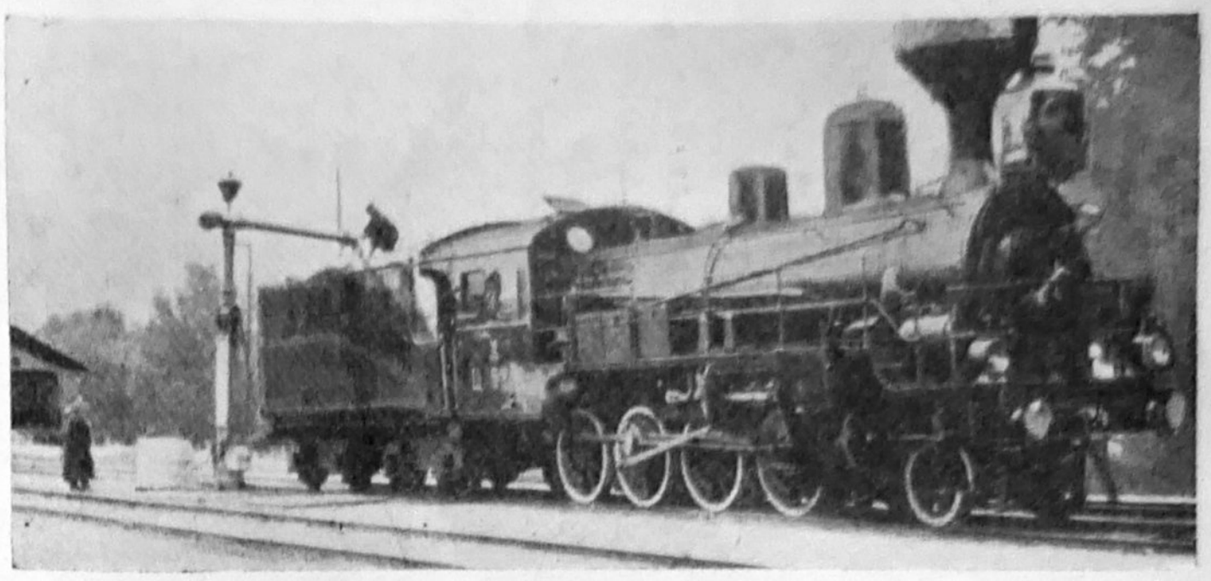
Even before 1920 the ever-increasing quantity of freight on the Chinese Eastern Railway, and the insufficient power of most of their locomotives, was causing great concern to the administration of the Railway. In 1920 a complete change was made in the executive personnel and a most capable Russian engineer, Mr. Ostroumoff, was appointed General Manager, and he devoted considerable attention to the problem of the rapidly increasing traffic. In 1921 the newly appointed Superintendent of Motive Power, Mr. Kalina, finally took active steps to remedy the situation. According to his plan of action the Decapod locomotives were immediately assigned to the most congested and difficult parts of the line, *viz.*: on the Eastern Lines from Harbin to Vladivostok and the Southern Lines from Harbin to Changchun, where the quantity of export freight had increased tremendously. In place of these Decapods other less powerful locomotives were assigned to the Western Lines, where the traffic was not so heavy. At that time the trains handled



Map of the Chinese Eastern Railway Showing its Connections with the South Manchuria Railway, the Chita Railway and the Ussuri Railway



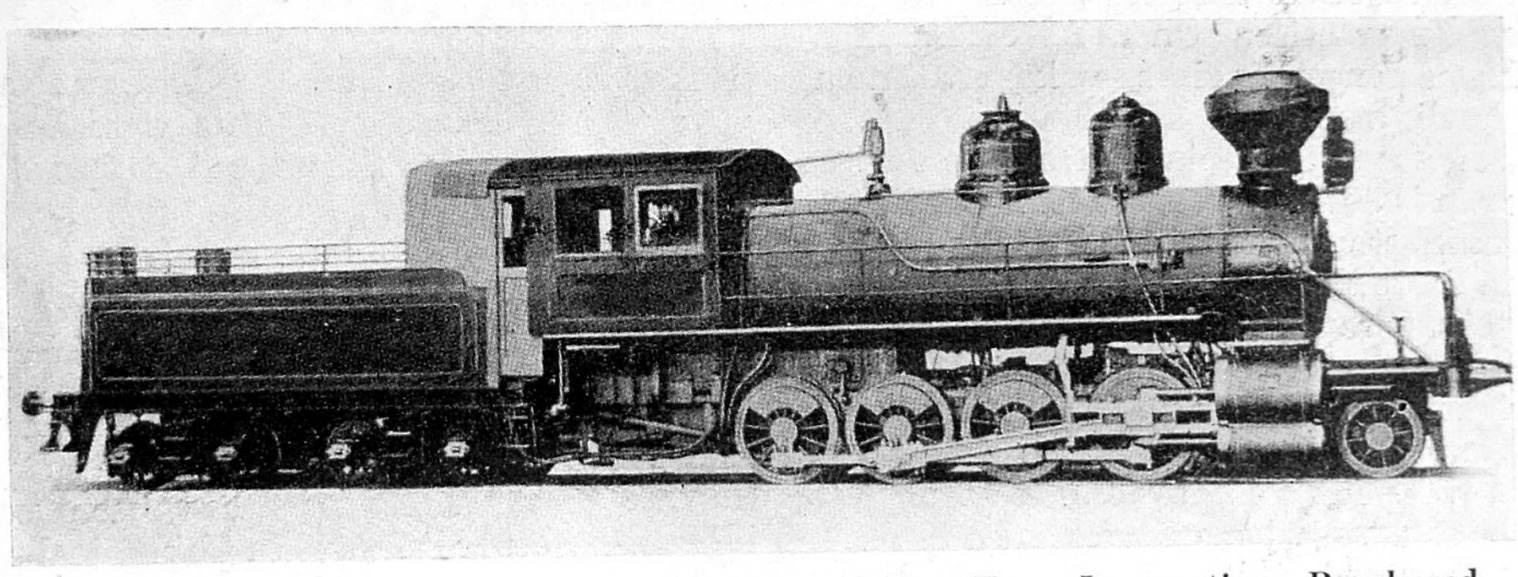
The First Long Run Passenger Train Arriving in Manchouli from Harbin



Locomotive of the Consolidation Type Built in Russia for the Chinese Eastern Railway and Designated by the Russian Letter "TZE"

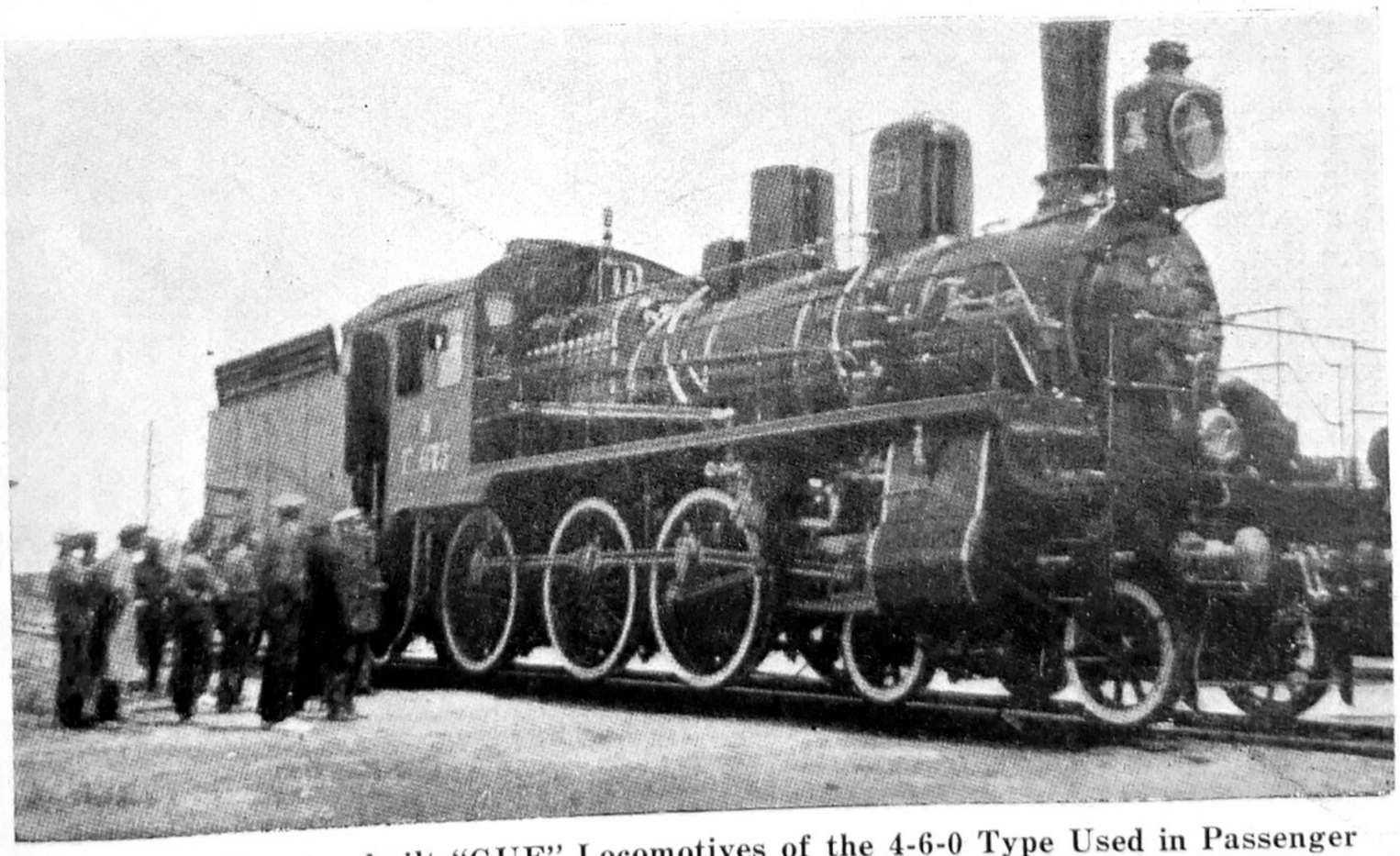
by the Decapod locomotives had a maximum weight of about 1,000 tons.

Having thus relieved the situation somewhat with the engines available, Mr. Kalina started to carry out a series of experiments with heavy trains, instructing the engine crews how best to handle these trains and how to keep all engines in good working condition. This hard and persistent work has started to produce results and every year the weight of the trains has gradually increased until, on some divisions, it reaches almost double the weight of the trains in 1921, when Mr. Kalina took over the duties of Superintendent of Motive Power. At present the weight of the freight trains which are handled by the Decapods is fixed at 90,000 poods (1,500 tons) on divisions of the road where the grades do not exceed 0.9 per cent. and at 135,000 poods (2,200 tons) on divisions where the grades do not exceed 0.7 per cent. On heavy grades up to 1.5 per cent. a second Decapod is used as a pusher.



One of the 121 Vauclain Compound, Consolidation Type Locomotives Purchased from The Baldwin Locomotive Works by the Chinese Eastern Railway in 1898

H. P. Cylinders	14-in. by 26-in.	Drivers, diam.	50-in.	Weight on drivers	125,000 lb.
L. P. ,,	24-in. by 26-in.	Steam pressure	180 lb.	,, total engine	143,000 lb.



One of the Russian-built "GUE" Locomotives of the 4-6-0 Type Used in Passenger Service

When conducting his experiments with heavier trains Mr. Kalina, at the same time, was giving serious consideration to the possibility of increasing the length of locomotive runs. He foresaw that, notwithstanding the heavy trains, there would soon be a shortage of locomotives on account of the rapidly increasing freight traffic, and, therefore, experiments were carried on and preparations made to operate locomotives on long runs.

In the initial stages of this work, during 1922 and 1923, long runs were inaugurated with passenger trains, as it was considered that the engineers driving the locomotives of such trains were more experienced and careful. In order to be sure of his ground, Mr. Kalina progressed very carefully, extending the runs of locomotives to 220 miles instead of the previous distance of 136 miles. Experiments with long runs of freight engines were carried on at the same time.

It will be of interest to note that during this first period Mr. R. E. Bedford, erecting engineer of The Baldwin Locomotive Works, at that time visiting Harbin, took part in some of the first runs, giving information as to how experiments on long runs were conducted in the United States at that time.

However, the question of long runs remained in its experimental stage until the winter of 1924, when Mr. A. N. Ivanoff, new General Manager of Chinese Eastern Railway, realizing to its full extent the important effect the long runs would have on the handling of freight, gave strong support to Mr. Kalina's projects.

Long locomotive runs were definitely put in force on May 1, 1925, for passenger trains and on November 1, 1925, for freight trains, which permitted the Railway to handle successfully the freight resulting from the bumper crops which occurred in the years 1925, 1926 and 1927, and the improved handling of this traffic netted the Railway a tremendous profit and enabled it to build up a large reserve fund.

The introduction of long runs on the Chinese Eastern Railway should be considered quite an accomplishment, as they met not only the usual difficulties which are encountered when introducing long runs in the United States, but also with exceptional difficulties on account of the idea which the Russian locomotive engineers have had for generations, that a locomotive should be assigned to the care of one man only. It is interesting to note that even such a progressive man as Mr. Ostroumoff, when he was General Manager, considered the long runs a dangerous experiment and at one time ordered them to be discontinued.

Besides this antagonism and the usual technical difficulties, Mr. Kalina had also to convert the engine crews to his ideas, and this was only made possible by his energy, his knowledge of working conditions and the energetic support given to him by Mr. Ivanoff.

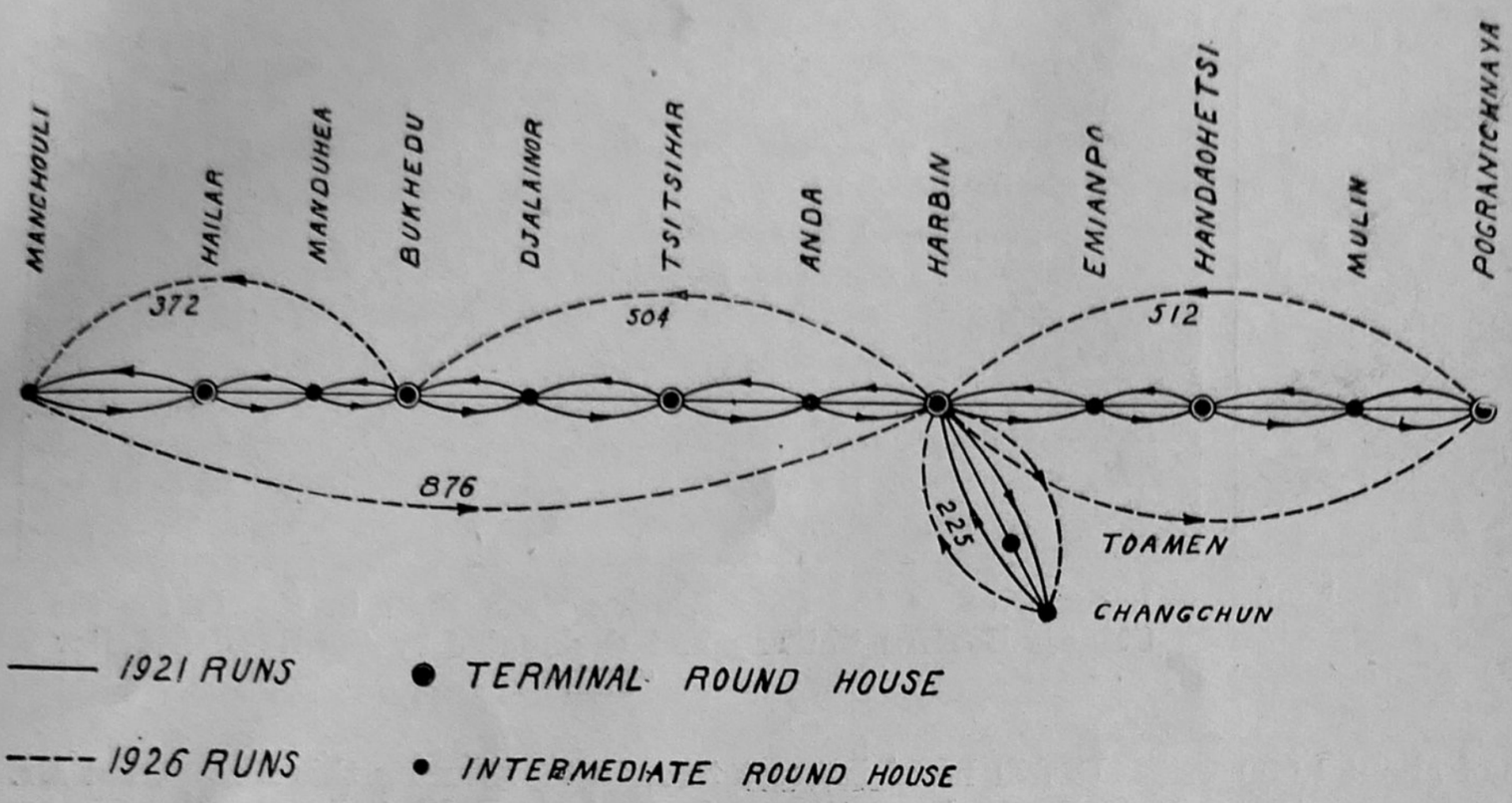


Chart Showing the Increase in the Length of Passenger Locomotive Runs Since 1921

The Figures on this Chart, and Chart at bottom of this page are Given in Kilometers. A Kilometer is Equal to Approximately Six-tenths of a Mile

This support has been continued by the latter's successor, Mr. Emshanoff, the present General Manager of the Chinese Eastern Railway.

As a result of this intensive effort long runs of locomotives have finally become the regular practice. On the Western Lines of the Chinese Eastern the passenger engines make continuous runs from Harbin to Manchouli, a distance of 530 miles, and the freight engines make runs of about 235 miles. On the Eastern Lines the longest passenger run is 307 miles and the longest freight run 154 miles. The diagrams illustrate clearly the increased length of the locomotive runs and indicate the location of the intermediate round-houses on the line. As a result of the adoption of long locomotive runs the mileage of passenger train engines has increased 44 per cent. and that of freight train engines 40 per cent.

At the time when the experiments were being conducted in connection with long runs, Mr. Kalina also gave much thought to improving and expediting the repairs of locomotives so as to make better use of the available power. To this end serious consideration was given to electric welding and the main shops of the Railway at Harbin were equipped with a Wilson electric welder of four-arc capacity, which permitted these shops to promptly take care of important repair jobs.

Furthermore, two welding machines of smaller capacity have been put in operation in roundhouses along the line, and a special portable gasoline engine unit was purchased and erected in a car. This permits of making urgent repairs wherever they are required along the line.

The schedule of major repairs to locomotives at the Harbin main shops has been considerably accelerated. In 1920 it took 200 days to carry out major repairs to a locomotive, but by the year 1922 Mr. Kalina had reduced this time to 120 days. The methods were constantly improved so that by 1925 major repairs were made in 45 days, and at the present time 22 days only are regularly allowed for overhauling a locomotive.

After the introduction of long runs quite a number of obsolete locomotives were taken out of service, leaving in operation the American Decapods for heavy freight trains, "Gue" engines for passenger traffic and "Sha" engines for light freight traffic. This is a further means of expediting the turn-over of locomotives and reducing the cost of maintenance, as a smaller variety of spare parts are required.

In 1926 a National Boiler Washing Plant was installed at the roundhouse in Harbin, making it possible to wash out boilers within four hours' time, whereas the previous method of washing engines cold required not less than 30 hours. This reduction of 26 hours in the time required for washing a boiler has resulted in a great saving, as the locomotives are in operation and earning revenue for a greater percentage of the time.

Notwithstanding the results already obtained in improving the traffic by increasing train loads and introducing long locomotive runs, Mr. Kalina is giving constant thought to the possibility of further improvements and in order to increase the speed of freight trains, which had already reached the maximum weight, a booster was ordered from the Baldwin Locomotive Works and one booster from the Skoda Works, both of which are being tried out in service. It is expected that the application of the booster will tend to increase the annual tonnage of freight moved by locomotives so equipped from 15 to 20 per cent.

It should be noted that the experiments with long locomotive runs were conducted by the Chinese Eastern Railway at the same time that similar experiments were being conducted by the railways of the United States and, although these investigations were entirely independent of each other, the long runs have given most satisfactory results in both countries.

Due to the careful selection and thorough training of engine and repair crews and the great attention given to the running repairs of cars as well as locomotives, the rolling stock of the Railway is now in much better condition than it has ever been before. The success which has attended the progressive policy of the Chinese Eastern Railway has been watched with considerable interest by other railways in China, including the South Manchuria, and it is believed that the example set by the Chinese Eastern will have an important effect on the future development of both the Russian and Chinese railways.

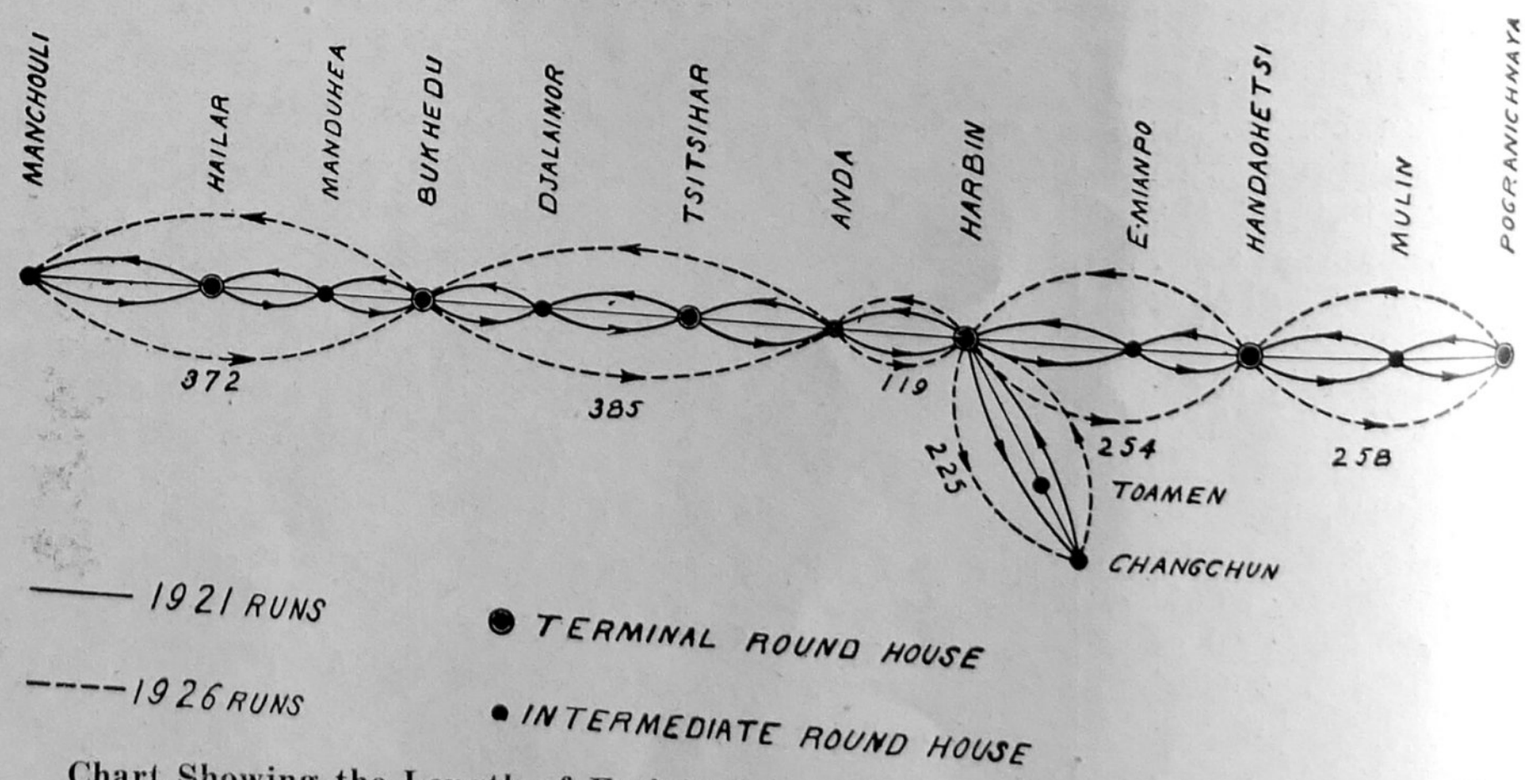
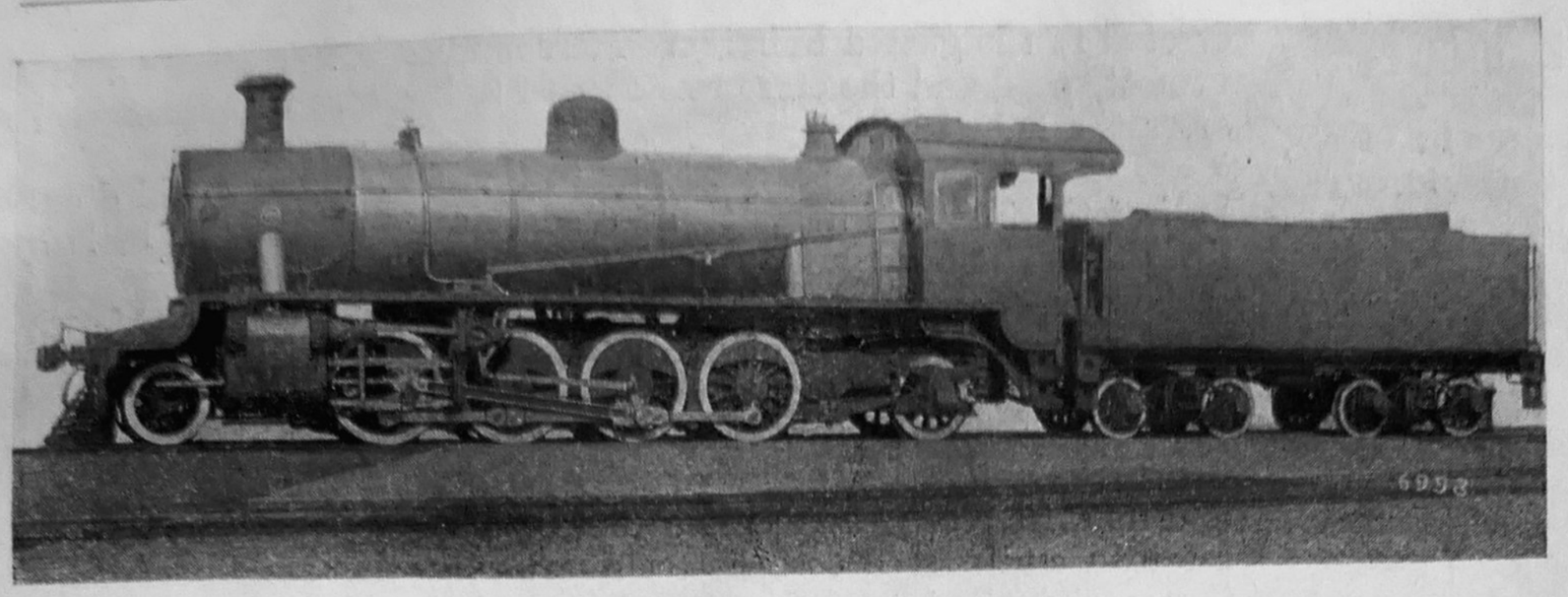


Chart Showing the Length of Freight Locomotive Runs To-day, as Compared with the Runs Made in 1921

New Japan Paraffin Co. in Manchuria

Managing-Director J. Honda of the new Japan Paraffin Co. which is affiliated with the South Manchuria Railway Co. in an interview with the *Manchuria Daily News, said:* "Not a piece of paraffin has yet been manufactured in Japan, while the annual demand reaches at least 20,000 tons. The new Company has been brought into existence pressed by this need. The new factory is being got ready at Tokuyama, Suo Province, just round the corner from Shimonoseki. We expect to turn out 7,000-8,000 tons paraffin a year to start with. When the home demand is met, what surplus there will be found will be marketed in China."



Mikado Type of Baldwin Locomotive

10 Baldwin Locomotives for China's Railways

ANDERSEN, MEYER & COMPANY have contracted to sell 10 Baldwin locomotives of the Mikado Type to the Ministry of Railways for the use of the Tientsin-Pukow line. The contract was signed by Mr. V. Meyer on behalf of Andersen, Meyer & Company and Mr. Sun Fo, Minister of Railways on behalf of the Government.

The following are the specifications :

Gauge of Track	4-ft. 8½-in.
Cylinder Diameter	20-in.
Cylinder Stroke	28-in.
Driving Wheel Diameter	54-in.
Wheel Base Driving Rigid ..	15-ft. 0-in.
Engine only	31-ft. 10-in.
Engine and Tender	59-ft. 3-in.
Boiler Diameter	72-in.
Boiler Pressure	200 lbs. per sq. inch
Fire Box Length	96½-in.
Fire Box Width	65¼-in.
Tubes, Number	139 2-in. dia. } 16-ft. 3-in. Long
Flues Number	24 5⅜-in. dia. }
Arch Tubes Number ..	4
Arch Tubes Diameter ..	3-in.
Heating Surface Tubes ..	1,176 sq. ft.
Heating Surface Flues ..	546 ,,
Heating Surface Arch Tubes	18 ,,
Heating Surface Fire Box ..	192 ,,
Heating Surface Total ..	1,932 ,,
Superheating Surface	464 ,,
Grate Area	43.5 sq. ft.
Weight in Working order approximate—	
Truck	19,836 lbs.
Drivers	140,000 ,,
Trailer	34,493 ,,
Engine	194,329 ,,
Tender	124,150 ,,
Total Engine and Tender	318,480 ,,
Traction Power	35,300 ,,
Tender Capacity—	
Water	5,289 Imp. Gallons
Coal	22,040 lbs.
Height above rail smoke stack	15-ft. 0-in.

New Buildings in Shanghai

(Continued from page 216).

building. This financial feat was accomplished with the help of E. Busch, architect, who is also responsible designing and supervising the construction of the new building. Since it was necessary for the architect to make his design conform to a narrow budget, the structure, while most modern, is plain both in its architecture and its mechanical equipment.

On the ground and first floors are 12 class rooms, an assembly hall, rooms for the head master and teachers and a spacious kindergarten. Nine of the class rooms face south and the drawing room and laboratory face north. These two first floors are entirely separated from the rest of the building.

The second floor contains apartments for the head master and teachers and on the top floor are apartments which will be rented, preferably to German families having children in the school.

The general contractor for the German school is Sun Nee Kee. A. Quoika is the contractor for the heating, plumbing and sanitary installations and the Eastern Industrial Electric Co. for the electrical equipment. Otis elevators are being provided by the American Trading Co.

The Cathedral School on Kiukiang Road, which is now under construction, is being built through the Henry Lester endowment. It will be one of the most modern and carefully planned school buildings in the Far East, rivalling those of England and Europe. Provision is being made for academic, scientific, fine arts and athletic work and recreation. Besides the regular class rooms and laboratories, there will be a covered playground, gymnasium, library, music room, scout and cub rooms, assembly hall large enough to seat 500 people and a tiffin room for the students. On the third floor there will be flats for the sub-dean and school master. It will be possible to care for 300 pupils in the school.

The ground floor of the building will be used as the Cathedral Church House. It will contain church club rooms and offices for societies.

The style of the building is Gothic. Reinforced, fire-proof concrete is being used in its construction with a finish of brick facing and artificial stone. A special ventilation system is being installed.

Palmer & Turner are the architects ; the contractors are Kung Kee for general construction, Scott, Harding for electric lights and lifts, the Shanghai Waterworks Co. for plumbing and heating and Crittal & Co. for the steel windows.

Automatic Convertor at Ueno Station of the Tokyo Underground Railway

(Continued from page 212).

The convertors are fitted with a centrifugal switch which acts upon the tripping mechanism of the direct current automatic circuit breakers. The bearing liners are equipped with temperature relays, Fig. 13. If one of these thermostats causes the machines to shut down, then the re-starting equipment is interlocked until the respective bearing has cooled sufficiently. The exciter voltage relay, in conjunction with the master controller, shuts down the machine if the auxiliary excitation fails during the starting period.

The starting period of the convertors is controlled by time relays. If the machines are not ready for operation within the prescribed time, the oil circuit breaker opens automatically, whereupon the machines must be started up anew.

Other interesting details, which have yet to be mentioned, are that the D.C. reverse current relays are designed as contact-ammeters, whilst the interpole windings of the convertors are used as shunt resistances. Drop-disc relays with current windings are provided for the individual trip circuits, so that the switchboard attendant may immediately ascertain from the inscription on the respective disc, what was the reason for release and then act accordingly.

As may be deduced from the above, the method of starting a rotary convertor, which is all in all somewhat complicated, is so simplified by the inclusion of a few auxiliary devices that its control can be effected perfectly reliably even by unskilled personnel. Faulty switching, which is to be particularly feared at times of disturbance is averted, so that a high degree of service reliability obtains.

The plant has now been in operation a year and has fully satisfied all anticipations, with the result that the railway management at Tokyo intend shortly to carry out further extensions adapting the identical means of control.

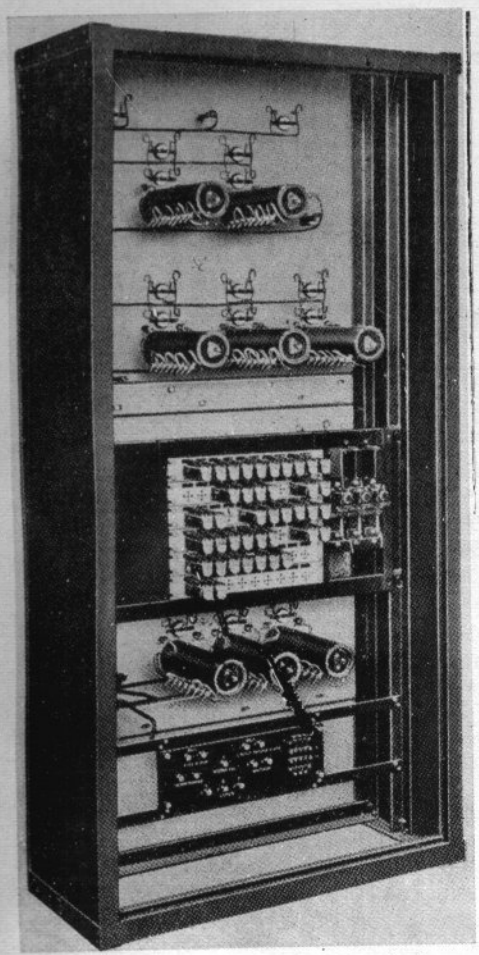


Fig. 10.—View of the Back of One Panel of the Control Board

the common push-button, confirmation being given by the control board signal lamps associated with the switch concerned. On completion of the operation the stepper switches and relays reset themselves to normal position.

When a circuit-breaker in a distant sub-station opens automatically, an alarm bell is set ringing in the control office, and the unit which has operated is indicated by a red lamp on the corresponding control panel. This signal, and also the lamp signals confirming the opening or closing of a circuit-breaker from the control office are initiated by auxiliary contacts on the circuit breakers and transmitted as coded impulses by relays and stepper switches in the way already described.

In addition to these normal condition operations, comprehensive provisions are made for dealing with various other contingencies. Some of the more important and interesting of these are as follows :—

Should a circuit-breaker change its position while impulses are being sent from the control desk to select a device for operation, the sub-station signal is stored until the incoming impulses are completed, when the latter are cancelled out and the stored signal is sent through to the control office.

Should a circuit-breaker change its position while a signal is being transmitted from the sub-station, its change is signalled immediately the first signal is completed.

Should a signal from the sub-station be in course of transmission when the supervisor proceeds to select a circuit-breaker from the control desk the selector switch produces no effect.

Should a circuit-breaker trip immediately after being closed a signal records the closing of the breaker, and then another signal indicates the actual position of the switch.

Should a fault exist on a direct current feeder when the feeder switch is required to close, excess current through an auxiliary contactor with a limiting resistance energizes a relay which prevents the main breaker from closing. This condition is signalled by the alarm bell and signal lamps at the control office.

Should any rotary converter become over-heated, the fact is signalled at the control office by an alarm bell and a red lamp which is mounted in the center of the rotary converter symbol on the control panel. This warns the supervisor that another set should be started up. The red lamp continues to glow until the overheated machine cools to a predetermined temperature.

In addition to the items already mentioned, the following apparatus is mounted on each control panel :—

A yellow lamp which glows intermittently when selecting impulses are being sent out from that panel.

A checking key by means of which all the lamp indications may be checked at any time.

Two blue lamps which indicate when a fuse blows on either the control office of sub-station equipment. An alarm bell also gives warning should this occur and the blue lamp continues to glow until the fuse is replaced. On the replacement being effected all lamp signals are automatically checked.

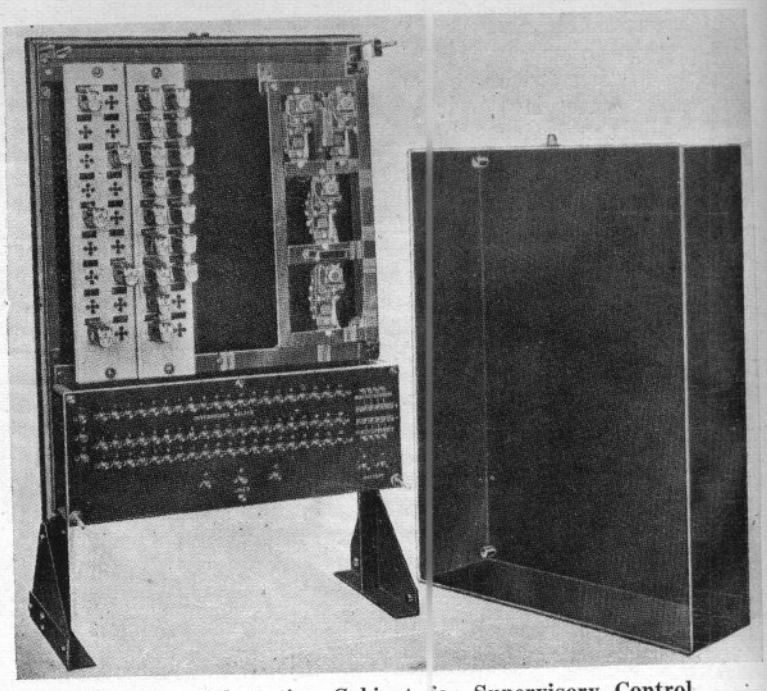


Fig. 11.—Sub-station Cabinet for Supervisory Control

A testing jack for testing the condition of the pilot lines by plugging in a special instrument.

The arrangement of the selector switches and other apparatus on the control panels is illustrated in Fig. 10. The panels constitute the fronts of independent cubicles which have removable doors at the back. At the sub-stations the relays and switching apparatus are mounted in dust-proof metal-cased cabinets, one of which is seen with cover removed in Fig. 11. Each panel of the central control board is connected with its corresponding sub-station apparatus cabinet by a pair of pilot line wires, and a return lead which is common to all sub-stations. An important feature of the system is that, irrespective of the number of circuit-breakers to be controlled, in each case the control and supervision is effected by means of only these three connecting lines.

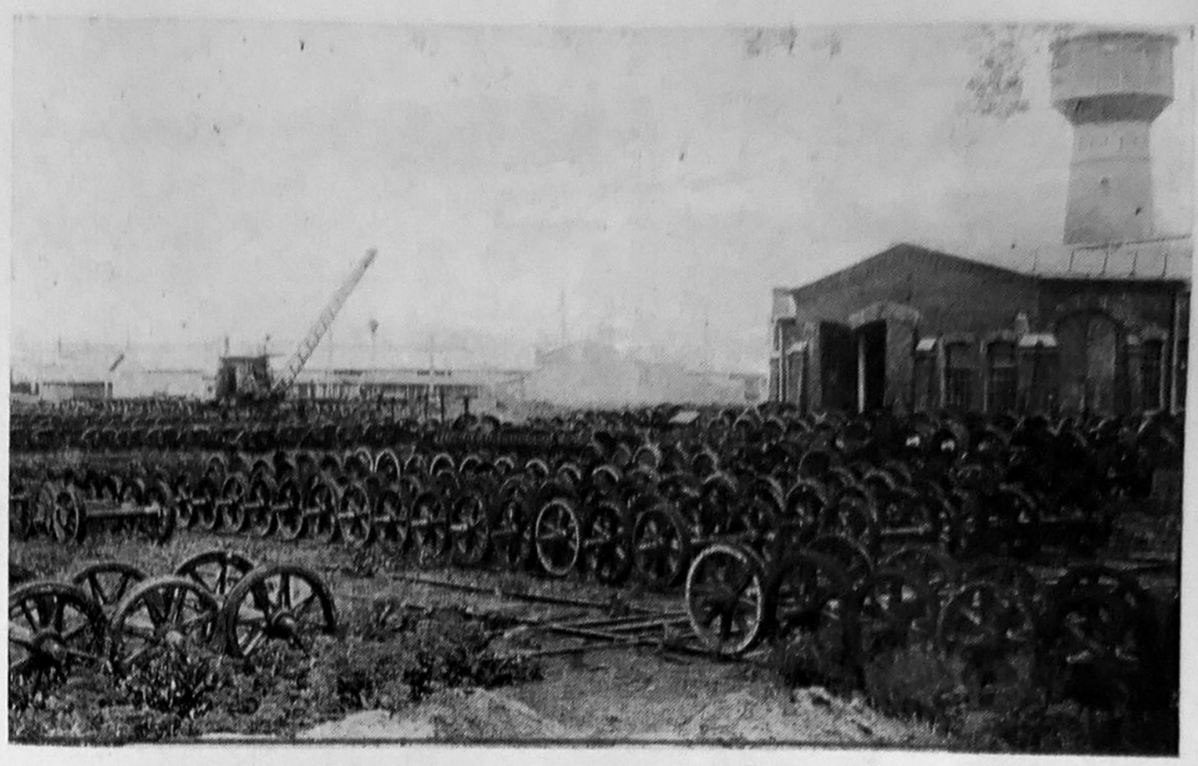
Experience with supervisory control has shown that it provides the most effective system of informed control which has yet been devised for power distribution systems. The control is as complete as that which could be exercised by a skilled engineer in each sub-station, but with the advantage of complete and immediate information at the control point regarding the conditions on the whole of the system. This feature of saving the time otherwise lost in receiving telephone reports and transmitting instructions to operators is of great importance in that it facilitates rapid resumption of service after any disturbance. For these reasons, in addition to the economic and other considerations already indicated, supervisory control is likely to find extended application both for electric traction systems and for power distribution networks.

Work on Canton-Hankow Railway

Mr. H. S. Chuck, managing-director and chief engineer for the unfinshed portion of the Canton-Hankow Railway, reported on his inspection trip over the proposed route linking up Chuchow (in Hunan) with Shiuchow (in Kuangtung province). Mr. Chuck was accompanied by Mr. J. Weir, Consulting Engineer to the Ministry.

He will arrange to start construction of the first 31-mile section of the line from the northern terminus of the Kuangtung end. The estimated cost for building and equipping this section will be approximately $7,000,000, and noteworthy engineering features include a bridge of seven spans with a total length of 760 feet at Shiukwan, and a 1,400 feet tunnel at Kaolin, which is about half-finished.

Foundry



Spare Wheel Yard

The Harbin Main Shops of the Chinese Eastern Railway

THE Main Shops of the Chinese Eastern Railway are situated at Harbin,—this city being the central point of the railway. Their construction was started in 1903 and completed to the end of 1907. The Main-Shops are situated near the Sungari river, and are connected with Harbin Station by two railway tracks. These Main shops were laid out at Leningrad (former St. Petersburg) and their annual productive capacity was planned to be as follows : Capital repairs of 90 engines, 80 passenger carriages and 400 freight cars.

Periodical inspection and repairs of passenger and freight cars as well as ordinary locomotive repair work was then expected to be done at the round house shops.

Besides the above work which is being done for the needs of the Chinese Eastern Railway itself, the Harbin Main-Shops had to take in 1916 the entire care of erecting the " Decapod " locomotives which were ordered in the United States of America during the war and shipped to Harbin *via* Vladivostok. Altogether seven hundred and ninety-four Decapod locomotives were erected during the period from 1916 to 1920.

The Harbin Main shops are divided into following divisions :

1. Locomotive erecting shop. 2. Boiler shop. 3. Passenger carriage shop. 4. Freight car shop. 5. Mechanical and Wheel shops, 6. Black-smith shop, and, 7. Foundry.

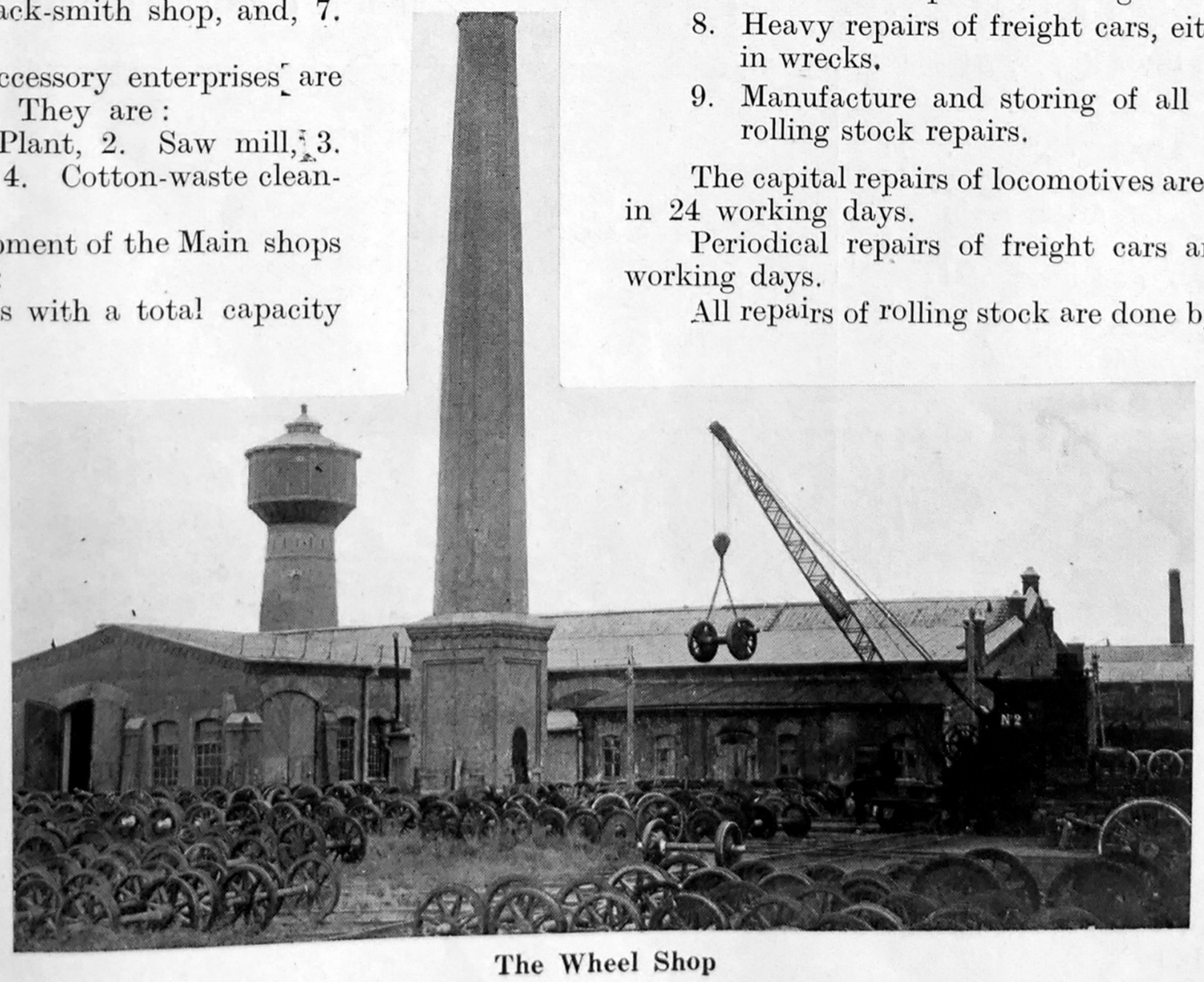
Moreover, several accessory enterprises are included in Main shops. They are :

1. Electric Power Plant, 2. Saw mill, 3. Linseed-oil factory, and, 4. Cotton-waste cleaning works.

The mechanical equipment of the Main shops consists of the following :

1. Four Power Units with a total capacity of 1,600 H.P.
2. Electric Motors for power drive from 1 to 50 H. P., 337.

   Electric Motors for travelling cranes, 53.
3. Steam heating Plants with a total heating surface, 602 m^2.
4. Machine tools of different kinds, 430
5. Pneumatic installations with a total capacity of 15,5 m^3 of free air per minute. . . . .
6. Eight Electric-Welding apparatuses . . . 8



The Wheel Shop

At present Harbin Main shops are doing the following rolling stock repairs :

1. Capital repairs of locomotives as follows : Freight locomotives, every 190,000 kilometers. Passenger locomotives every 250,000 kilometers.
2. Ordinary " small " locomotive repairs every 32,000 kilometers for freight locomotives, and every 42,000 kilometers for passenger engines.
3. Incidental repairs for wrecked locomotives.
4. Capital repairs of passenger carriages every seven years of their service.
5. Ordinary repairs of passenger carriages every $3\frac{1}{2}$ years service after the capital repairs.
6. Periodical inspection of passenger cars after their one year's service.
7. Periodical inspection of freight cars after three years service.
8. Heavy repairs of freight cars, either worn out or damaged in wrecks.
9. Manufacture and storing of all spare parts necessary for rolling stock repairs.

The capital repairs of locomotives are made on special schedules in 24 working days.

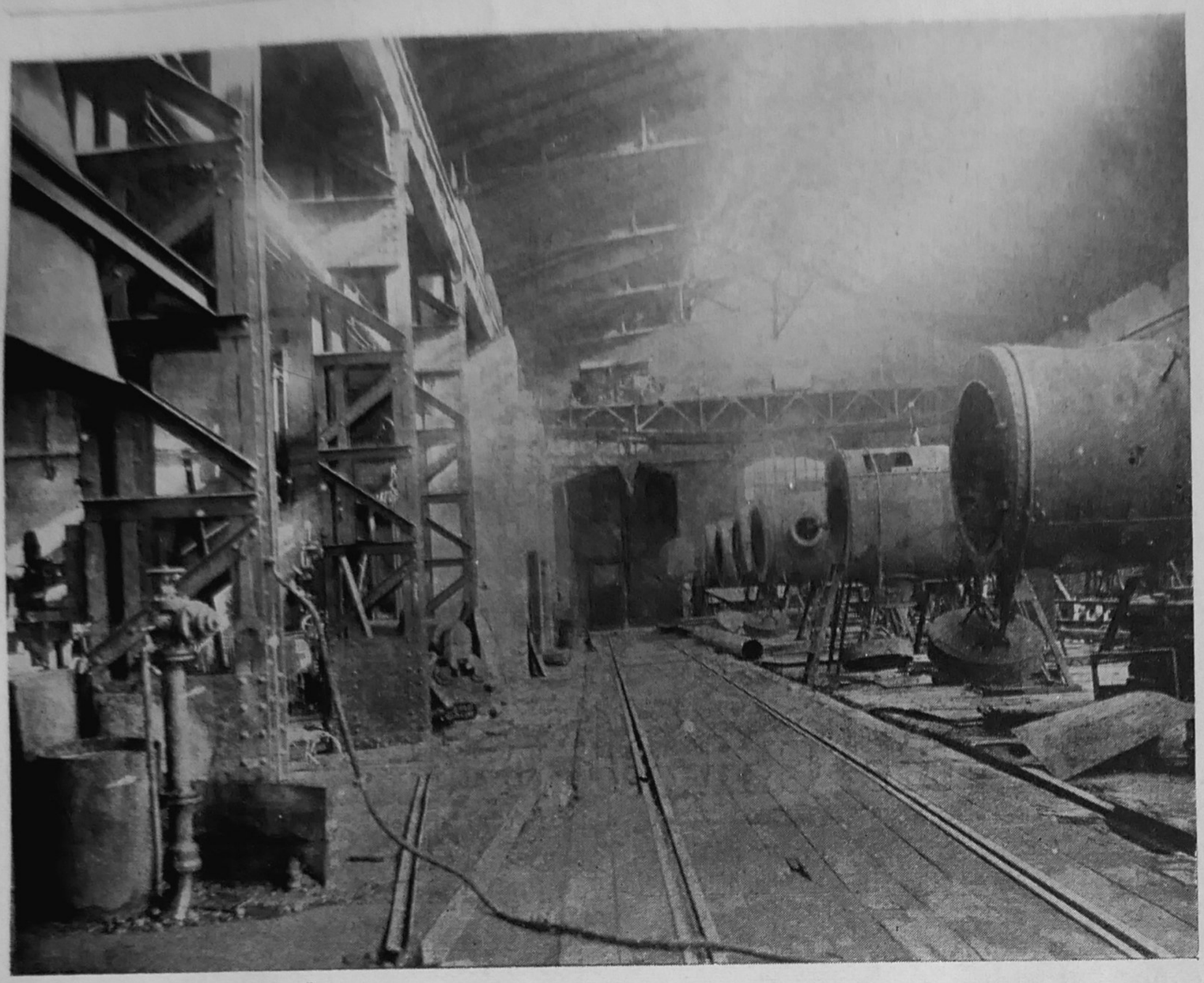
Periodical repairs of freight cars are also scheduled for six working days.

All repairs of rolling stock are done by piecework in accordance to regularly fixed rates which are based on time, and payments are done according to Prussian-Hessian system without limiting of percentage of gains.

1.—Locomotive Erecting Shop

The number of locomotives repaired :

Capital repairs, 37.
Incidental repairs, 64.
Average time of capital repairs in calendar days, 37.
Average time of capital repairs in shifts, 28.



The Boiler Shop

2.—Electric Welding Shop

The following units were repaired the electric welding shop:

1.	Working locomotives	41
2.	Assembled boilers	68
3.	Iron and steel parts	14,793
4.	Cast iron parts	1,462
5.	Brass parts	974

Repairs done by the travelling electric-welding workshop, Car No. 2081:

1.	Working engines.	55
2.	Assembled boilers	28
3.	Iron and steel parts	1,360
4.	Cast iron parts	98
5.	Brass parts	91

3.—Boiler Shop:

Productivity of shop:

Output of boilers after main repairs.. ..	41
Output of engine boilers after incidental repairs	15
Output of stationary boilers after main repairs	41
Output of stationary boilers after incidental repairs	2

4.—Passenger Carriage Shop

Passenger carriages repaired:

Capital repairs of 4-axle cars..	13
2 ,, ,, ...	63
or total axles	178
Ordinary repairs of 4-axle cars	11
2 ,, ,, ...	45
or total axles	134
Yearly inspection of 4-axle cars	68
2 ,, ,, ...	23
or total axles..	318
Total number of 4-axle cars	92
2 ,, ,, ...	131
or total axles	630

5.—Freight Car Shop

Freight cars repaired:

Box-cars	1,071 cars	or 1,152	units
Platforms	189 ,,	,, 189	,,
Coal and log cars ..	39 ,,	,, 39	units
American coal cars..	238 ,,	,, 476	,,
Tank cars	84 ,,	,, 84	,,
Special cars	57 ,,	,, 61	,,
Total..	1,678 ,,	,, 2,001	,,
American coal cars for the Ussuri Railway	170 ,,	,, 340	,,
Totally repaired ..	1,848 ,,	,, 2,341	,,

6.—Wood-Working Shop

Shop production: (Production in cubic meters of wood put through various operations)

Finished soft wood	7,612 cub. m.
,, hard ,, ...	707 ,, ,,
Total ..	8,319 cub. m.

Unfinished material despatched:

Soft wood	529 cub. m.
Hard ,, ...	443 ,, ,,
Total ..	972 cub. m.
Altogether ..	9,291 cub. m.
Output per man per hour ..	0.09 cub. m.

7.—Mechanical Shop

New articles	981,735 kgs
Old articles	320,753 ,,
Productivity of the shop in kgs equivalent to new manufactures ..	1,061,923 ,,
Shavings	37,351 ,,
Productivity per lathe, per workman, per shift (8 hours) in kgs	48.8
Productivity per man per shift (8 hours) in kgs	23.6

Output of Locomotives After Capital Repairs and Duration of Jobs Per Years

Years	Output of locomotives	Shift days standing	Calendar days standing	Years	Output of locomotives	Shift days standing	Calendar days standing
1922 ..	67*)	108	115	1925 ..	29	61	77
1923 ..	60*)	55	70	1926 ..	34	43	54
1924 ..	32	51	64	1927 ..	37	28	31

*Considerable output was due on account of re-establishment of the locomotive stock.

(Continued on page 236)

The Mechanical Shop

Engineering Notes

ELECTRIC LIGHT, POWER AND TRACTION

SANYO CHUO SUIDEN K.K. (Sanyo Chuo Hydro-electric Co., Ltd.).—The Sanyo Chuo Suiden K.K. has ordered a turbo-generator with a capacity of 35,000 k.v.a. (Prince about Y.1,000,000 Discount Y.140,000) from Mitsubishi Denki K.K. and another from Metropolitan-Vickers.

It is reported that orders for transformers and switchboards have not yet been decided upon.

HOKKAI SUIRYOKU DENKI K.K. (Hokkai Hydro-electric Power Co., Ltd.).—The Hokkai Suiryoku Denki K.K. has decided to improve the equipments of Teizankei No. 1 Power Station, work to be started in the near future. The two generators, now installed there, capacity 400 k.w. are to be replaced and the way also to be improved.

The cost of these improvement is estimated at some Y.300,000. The capacity will be increased to 1,500 k.w., it is reported.

CHOSEN CHUO SUIDEN K.K. (Korea Central Hydro-Electric Co., Ltd.).—License has just been granted for a new electric power company in Korea, to be known as the Chosen Chuo Suiden K.K., with a capital of Y.3,500,000. The chief promoter of this firm is Mr. Takenosuke Ogura, the president of Daikyu Denki K.K. The plan of this company is to develop water power on the Gento River, on the upper reaches of Moshuinsen River in Zenra Hokudo. The stream of Gento River is to be dammed, thereby producing an effective head of 900 ft., power capacity estimated at 5,000 k.w.

INABA SUIRYOKU DENKI K.K.—The Inaba Suiryoku Denki K.K. capitalized at Y. 2,000,000 is affiliated with Nippon Denryoku K.K. It has just begun the construction of its No. 1 power station with a capacity of 2,268 k.w., on the Hatto River, at Sakuraba in Tottori Prefecture.

Cost of construction is estimated at Y. 1,000,000, to be completed in September, 1930. This works out at about Y.441 per kw.

The power generated is to be supplied to the Sanyo Chuo Suiden K.K. It seems strange that this company can not take care of its own power requirements without continuing to buy from other concerns.

RAILWAYS

TO MAKE S. M. R. CO. A. PRIVATE CORPORATION.—Tokyo wires that President Yamamoto of the S.M.R. Co. has proposed to Premier Tanaka to transfer the S.M.R. Co. from the present semi-Government to purely private management, removing all supervising authority over the Company's Directorate, and to increase the present capital of Y.440,000,000 to Y.1,000,000,000, the Government assets in the Company including both capital and share capital being repaid by annual instalment.

TENDERS FOR PURCHASE OF RAILS AWARDED TO JARDINE ENGINEERING CORPORATION.—Tenders for the purchase of rails and parts amounting to twenty-eight thousand gold dollars ($G.28,000) for the Shanghai-Hangchow-Ningpo Railway has been awarded to the Jardine Engineering Corporation. The report of the award was submitted by a Committee composing of technical experts and other staff members of the Ministry of Railways. Telegraphic instructions approving the purchase of three new locomotives for the Canton-Kowloon Railway Administration. The Kwangtung Provincial Government was also requested to assist in carrying out the transaction. The Tientsin-Pukow Railway Administration has also decided to purchase sixty thousand sleepers from America, exemption from import duty on which has already been granted by the Ministry of Finance.

NEW NAME OF PEIPING-MUKDEN RAILWAY.—The Peiping-Mukden Railway will hereafter be known as Liaoning-Peiping Railway, according to a mandate of the National Government.

NEW VIADUCT IN SIAM.—The King of Siam opened the new viaduct spanning what was formerly a dangerous railway crossing near Hua Lampong terminus on April 8. The structure cost 225,000 ticals.

NEW RAILWAY LICENSED IN JAPAN.—The Department of Railways has granted a license for a new electric railway, Yoro Denki Tetsudo, mileage five miles and 40 chains, section from Sumimata Machi, Anpachi Gun to Kiyota Machi, Gifu City, Gifu Prefecture.

ROLLING STOCK.—The Ministry of Railways has requested the Military authorities to allow the Ministry to convert the armored cars and armored locomotives formerly used for military transport on the Kiukiang-Nanchang Railway into regular passenger and freight cars and service locomotives respectively for ordinary traffic. It is learned that steps are being taken by the Military authorities to comply with the request.—*Kuo Min.*

TOKYO CHIKA TETSUDO K.K.—(Tokyo Underground Railway Co., Ltd.)

The Ueno-Manseibashi Line now under construction is expected to be opened some time during October this year, which is about two months earlier than the original schedule. The construction has already been completed for 80 per cent. and the installation of rails was started from April 10. The fare will be 10 sen average, to connect with Ueno-Asakusa Line which is in operation at present.

The third part of construction, Manseibashi-Kanda Station Line, commenced on April 1.

NEW TSITSIHAR-KOSHAN RAILWAY.—On the new Tsitsihar-Koshan Line, rails have already been laid from Tsitsihar up to Tahaer, 29 kilometres in distance. Construction supplies for the next section are now being transported. The 98 kilometre section from Tahaer to Taianchen, the earth work has already been finished, and rails are now being laid.

Then, again, in answer to the wishes of people of the Paichuan district, a branch line is to be built, deviating from Taianchen over the distance of 90 kilometres to Paichuan, work being taken up on the return of the thaw.

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15 CHINESE RAILWAYS PLANNED.—In order to carry out the proposed construction program which provides for the building of two thousand miles of railway each year for the next ten years, the Ministry of Railways is making plans for the construction of 15 short railway lines to be finished in the next six years. Sepecial investigators have already been despatched to investigate economic and geographic conditions in the various districts which the proposed lines will traverse as a preliminary step to the determination of the exact course of the railroads.—*Kuo Min.*

NEW KIRIN-HAILUNGCHENG LINE.—The Kirin-Hailungcheng Line construction work has progressed as far north as 27.8 kilometres south of the city of Kirin. Originally, the entire building work was expected to be finished by the end of the current month, but a few rivers, including the Enteho, have got to be bridged over, and, the rise of the river water from the thaw is retarding the work. Moreover, the rails on hand are found short, and the return of rails enough for 13 kilometres, as rented to the Mukden-Hailungcheng Line, was demanded, but the demand is not yet acceeded to. Then, the bridge building supplies on hand are found insufficient.

NEW CHEKIANG RAILWAYS.—The Province of Chekiang will be laying down tracks for three inter-provincial railways with Hangchow as the central point, if plans completed by Mr. Cheng Ching-chun, Provincial Commissioner of Reconstruction, can be carried out. The proposed lines will be the Hangchow-Nanchang, Hangchow-Foochow and Hangchow-Anking lines. The project is now under consideration by the Chekiang Provincial Authorities and will be submitted to the State Council for sanction.—*Kuo Min.*

INDUSTRIAL

MINAMI MANSHU TETSUDO TO BUILD A STEAM POWER STATION.—It is reported that the South Manchuria Railway Co., Ltd. has decided to build a steam power station at Anshan with a capacity of 50,000 k.w. The power is to be used for manufacturing pig iron (400,000 Tons.) and sulphate of Ammonia.

The construction cost is estimated at some Y.100 per 1 k.w. total cost Y.5,000,000.

ONODA SEMENTO K.K. (ONODA CEMENT CO., LTD.—Preparations are being made for the construction of two new mills, one in Miye Prefecture at Haruta Mura, capacity 100,000 barrels a month, another in Korea with a capacity of some 60,000 barrels a month. For the Miye Mill the company is negotiating for the purchase of site, in secret. The plan is attracting the attention of the industry, because of the large size of new mills.

NEW CEMENT MILLS.—The Nishi Tama Mill of Asano Semente K.K. (Asano Cement Co., Ltd.) has just been completed and put in operation, capacity 80,000 barrels a month. Another mill of Nanao Semente K.K., known as Nanao Mill, capacity 70,000 barrels a month, has alo been completed and is to be put in operation some time this month.

There is some apprehension in the market that, in case the output from these mills begin to appear on the market, it may weaken the market to some extent. This apprehension is denied by experts, because the output of these mills is of a quality different from ordinary Portland cement, being a better guality of cement. In addition, the demand for this year is estimated at 15 per cent. more than last year and, in view of the present condition of the market, a reduction in the rate of production limitation—from 26 per cent. to 20 per cent.—is suggested for June/July/August.

ACETIC ACID PLANT IN JAPAN.—The Japanese Synthetic Chemical Laboratory at Ogaki, Gifu Prefecture, which was established some time ago with a capitalization of Y.200,000, recently was taken over by the Mitsui interests, who raised the capitalization to Y.1,000,000.

Up to now 80 per cent. of the total demand of Japanese acetic acid has been supplied through the hands of the Mitsui interests and now they have control of the entire supply.

Japan has been making a study of the manufacture of synthetic acetic acid for many years and the national Treasury gave subsidy of Y.30,000 for its encouragement last year. Although Japan has succeeded in manufacturing synthetic acetic acid of an excellent quality, the monthly output is only 10 tons at present.

The Japan Synthetic Chemical Laboratory will complete its new factory by next August and new machines will be installed in October, so that trial operations will take place within the year. The laboratory expects to supply 90 per cent. of the domestic demand for acetic acid.

The Japan Synthetic Chemical Laboratory is the only establishment that uses the synthetic process of manufacturing acetic acid, carbide being used as the pivotal point of the process. The Government has also decided to grant Y.30,000 toward the encouragement of the industry this year.

BINDING

THE EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

遠東時報

上海仁記路拾六號

IN MEMORY OF SUN YAT-SEN

By George E. Sokolsky

SOME RAILWAY PROBLEMS IN CHINA

FINANCING IN A FOREIGN CONTRACT

AMERICA, JAPAN AND CHINA

By Frederick Moore

Vol. XXV | June, 1929 | No. 6

Japanese, Korean and Mongolian languages and numerous dialects. He spent most of his time reading newspapers in these languages. He met Dr. Sun on several occasions when I was present but I heard nothing of a political nature. After his conversation with M. Joffe, the Russian contact was moved to Canton and naturally I could know nothing, from direct personal experience, about that.

When I arrived in Shanghai in 1919, I had spent a year in the North after having witnessed the most stirring days of the Russian Revolution in Petrograd. Dr. Sun was keenly interested in the details of this situation. He wondered always why others succeeded in their revolutionary activities while China failed. He always emphasized the "will of the people," and he insisted that no movement, no military effort could possibly succeed in China, which ignored the "will of the people." In an interview he once gave me on this subject, he said.

"My attitude toward the Peking government is the same as my attitude toward other factions in China. The most pressing matter before the Chinese people to-day is the unification of China behind one central government which shall function in accordance with laws and the will of the people. It is only unification achieved on this basis that can protect the people and prove to the world that the Chinese are sincere in their efforts to establish a modern and effective government capable of handling, independently the problems confronting a modern state.

"All factions in China will eventually have to adopt this program and significant progress has, within the last year (1922) been made in this direction. Many of the militarists who hitherto regarded themselves as supreme and above the constitution and Parliament might curry public favor by declaring themselves the protectors of both.

"When I returned from Canton the word went forth that I was defeated and discredited. My opponents did not understand that Sun Yat-sen does not matter but that his ideals and principles can not be defeated or discredited, and that the present situation in Canton is only another indication of the insistence of the Chinese people that these shall be realized. My desire is to unify the whole of China."

Even in this cursory sketch, it is impossible to omit mention of Dr. Sun's wife. Mrs. Sun's personal charm, her all-pervading sweetness, her keen sense of justice and her unselfish devotion to "the Doctor" brought to her the affection of all his friends. One sometimes wonders how much of his greatness is due to her inspiration and the strength that comes from the love and support of a great and good woman.

I never saw Dr. Sun after 1923. The attacks upon him by the foreign Press, the attempt to prevent him from landing in Shanghai, and the presence of Borodin and other Russians on his staff, made it difficult for a non-Russian foreigner to see him. Then he died on March 12, 1925, curiously enough on the same day and the same city as died my closest friend in China, Roy Anderson.

In 1926, I visited Canton and experienced the religious significance of the personality of Sun Yat-sen. The following description was written immediately after witnessing a Monday weekly service:

It is Monday morning. The work of a new week is to commence. At the Whampoa Academy, the Central Executive Committee, the Kuomintang branches, every barrack, every army in the field, among boy and girl scouts, in every Government office, men and women stand bare-headed waiting for the presiding officer to call the meeting to order.

The gavel is struck against the table. The room, the camping grounds, the assembly hall and office are in profound silence. Together in harmony heads are bowed three times before the picture of Dr. Sun Yat-sen. Then his last will and testament is read, the statement of a dying man to his followers. No one whispers or even dares to cough as the oft-repeated words of the dead leader are pronounced. Then there is a three-minute silence for self-examination and relevation, for consideration of the doctrine and the self-determination of fitness for participation in the work of the Kuomintang. After the silence, reports are read as regards the work of the party and the activity of the particular group attending the service.

Nowhere in China have I witnessed any gathering of Chinese so emotional, yet so peaceful and profound, as at the ceremony of the reading of the will on Monday morning. I saw such a ceremony once in Shanghai, when a memorial service was held for Dr. Sun at West Gate, but it was tawdry and chaotic. In Canton, every moment of the silence breathed a new atmosphere, reminding one of the tremendousness and strength of the people of China and the heart-breaking difficulties facing those who would win for her national greatness, and for her people racial equality. Even the casual visitor, not a member of the Kuomintang, even a foreigner in a city where now foreigners are perhaps not always welcome, was moved. He also bowed his head three times. He also listened to the reading of monosyllables which he did not understand. He also stood in silence and reverence. He also found peace and thought in the three minutes of silence. He also was moved to sympathy and friendship for those about him. Such is the heritage of Sun Yat-sen. Therein lies the full significance of Sun-Yat-sen. He has become in death, even a greater and more powerful leader than he was in life.

The Kuomintang to-day may not be what it was in 1926. The Party may have degenerated because of the prevalence of militarism and the absence of really great leaders, but the spirit of Dr. Sun Yat-sen lives on. Out of this spirit alone can come the new and greater China.

Some Railway Problems in China

THE startling outbreak of civil war along the Lunghai and Kinhan Railways was accompanied by the distressing reports of the heartless destruction of bridges, telegraph poles, tunnels and the road-bed of these lines by the Kuominchun troops. Similarly, a Hongkong report dated May 11, states that one of the largest bridges on the Canton-Kowloon Railway over the Shektan River was blown up by Cantonese troops to check the Kuangsi advance. It is difficult to believe that at a time like this, when the Ministry of Railways is doing everything possible to reconstruct the existing lines and to create new ones, the militaristic vandals on all sides continue their campaign of unmitigated destruction. According to a *Kuo Min* report on June 5, the cost of repairs for damage done on the Lunghai alone is estimated to amount to $4,000,000. It is possible that this may be exaggerated but it is difficult to understand why there should be any destruction of China's few thousand miles of railway by Chinese generals. How can they expect that the era of reconstruction will commence, when they are constantly hampering and impeding the administrative officials who are devoting themselves to a new China.

In this connection, it is interesting to read Mr. Yeh Kung-cho's address at the first annual meeting of the Railway Society of China.

Mr. Yeh Kung-cho spoke on railways and their relation to the people's living or the people's existence. He divided his address

into three parts and said that, before the construction of a network of railways was started, a detailed scheme must first be drawn up as to the more important lines and those which were of less importance. Those which were more important should, naturally, be first constructed, after which work on the others could be started. For instance, he said, the building of railways in the provinces of Sinkiang and Kansu would not only greatly facilitate the defence of the nation, but they would be of great assistance in the matter of relief work in northwestern China, where hundreds of thousands were starving daily. Mr. Yeh was of the opinion that these should first be built. The Shanghai-Woosung Line, in his opinion, was of comparatively less importance because Woosung was connected with Shanghai by the Whangpoo River, but, owing to the lack of a detailed scheme beforehand, the Shanghai.-Woosung Railway was the first railway to be constructed in China. Even up to now the question of railway construction in Sinkiang and Kansu had not been taken up.

Secondly, Mr. Yeh dealt with the question of freight charges, transportation expenses as a whole, and said that these were by far greater in China than any other country in the world. For instance, he said, wheat, the raw material for making flour, was formerly one of China's main products, but now 70 per cent. of the wheat consumed by the flour mills of Shanghai was imported either from Canada or from Japan. The reason for this was that shipping expenses from Canada were much less than the cost of transporting wheat from the interior provinces of China. The Canadian merchants utilized their opportunity and shipped wheat to China at a very low freight charge. Indeed, special concessions were granted to Canadian merchants by the Canadian railways to encourage them to ship wheat to China. For this reason, the price of Canadian wheat was cheaper than the price of wheat grown even in the southern section of the Tientsin-Pukow Railway.

Continuing, Mr. Yeh said that, in Germany, after the Great War, freight charges for shipping German products abroad were much lower than the charges made for transporting German products from one place in that country to another. This was why home industries in Germany had developed by leaps and bounds. The freight charges of the Chinese Government railways were by far too high in comparision with those charged by railways in foreign countries. Under such conditions, how could China enter the world's economic war ? How could China compete with foreign powers in economical competition ?

Conditions in railway transportation are constantly changing, the speaker said, and it was the duty of railway experts and those present at the meeting to discuss various questions relating to railway transportation so that such questions could be solved and easily handled in the event of changes being brought about.

In recent years, owing to the interruption of railway communications by constant internecine warfare and other reasons, only a very small quantity of grain came from the interior provinces, whilst the value of foreign imported grains had reached approximately $800,000,000 annually. Should railway communications not return to normal in the early future, the Chinese grain question would become more and more serious.

Dealing with the third part of his speech, Mr. Yeh said that, owing to the present political situation in China, the limited amount of rolling stock in the country had not been utilized to the fullest extent and advantage. Civil warfare had caused the destruction of much useful rolling stock, passenger cars, freight vans and locomotives. Not only did the railways suffer considerably, but the merchants suffered because their goods could not be sent to customers. Owing to the interruption of railway communication in Shantung Province, for instance, the British-American Tobacco Co., of Shanghai had been unable to purchase tobacco leaf from that province, so they naturally turned to foreign sources for the commodity. Thus both the Chinese as well as the foreign consumer suffered. It was Mr. Yeh's concluding hope that this state of affairs would be remedied and remedied very quickly. He hoped that the Society would be of great assistance in bringing about this fruitful end.

The fault does not lie with the Ministry of Railways or the engineers, Chinese and foreign, who are working at the job in spite of heart-breaking difficulties. The Engineer appreciates the fact that the damage done to a railway by military vandalism is greater than the mere destruction of rails or bridges ; it makes it increasingly difficult for the engineers to attract capital for their enterprises. This is naturally of the utmost importance, for China needs huge amounts of capital for the development of her railway system and unless the militarists stop interfering with existing lines, it will be increasingly difficult for the engineers to raise capital for new lines.

Mr. Sun Fo, the Minister of Railways, submitted a memorandum to the second Plenary Session of the Central Executive Committee of the Kuomintang, proposing that $150,000,000 be appropriated from the British and Russian Boxer Indemnity funds, for railway purposes. His memorandum follows :—

" The program of railway reconstruction was carefully outlined in Dr. Sun Yat-sen's plan for the industrial development of the country, for the late leader of the Chinese revolutionary movement realized that the development of China's communications was of vital importance to the livelihood of its people, and to its military and political affairs. In order to fully carry out the wishes of Dr. Sun, the National government has established the Ministry of Railways to supervise the reconstruction of the country's railways.

" Since my assumption of the post of Minister of Railways, it has been my daily work and hope gradually to complete the railway program of the late leader, Dr. Sun. Last January, I submitted a plan asking for the appropriation of a certain portion of the Customs and Boxer Indemnity funds for the reconstruction of the railways. The matter was discussed at a meeting of the Central Political Council, which later referred the question to three committees.

" The first committee was to examine the railway plan ; the second the question in connection with the use of the Boxer Indemnity Fund and the third the use of Customs funds. The first committee submitted its report and the second has already begun investigations, but for various reasons the Customs funds committee has not yet started its work. To this day, therefore, no action can yet be taken by the government.

" In order to hasten the program of railway reconstruction, the Ministry of Railways had sent experts to various provinces for survey work. With the complete suppression of the Kwangsi rebellion, for the strengthening of the prestige of the Central government and in order to immediately carry out the government's reconstruction with its railway development plans.

" This will greatly increase the confidence on the part of the friendly powers in the sincerity of the National government to face its problems and will also fulfill the aspirations of the Chinese people. Even though the finances of the country may be so crippled at the moment that it is found impossible to proceed with the entire program of railway reconstruction, the plan may be worked out gradually.

" As the railway development is being divided into three periods and the completion of the Canton-Hankow, Lunghai and Tsang-Shih lines belongs to the first period, work should be started at once for the completion within four years of the former two railways. It is estimated that $64,000,000 will be needed for the completion of the Canton-Hankow railway, and $85,000,000 for the Lunghai line. It is hoped that the total amount of $150,000,000 will be appropriated from the British and Russian Boxer Indemnity funds for the work. The bonds will be issued by the Ministry of Railways, using the Boxer Indemnity funds as security. The two railways are to be completed within four years.

" The profits of the two railways will be later turned over to the Central government for educational purposes. In fact, this is the safest investment the government can make with its educational foundation funds, and the plan will benefit both the educational enterprises of the government as well as its railway reconstruction projects. Trusting this proposal may meet the approval of the Second Plenary Session of the Central Executive Committee of the Kuomintang,

(Sgd.) " Sun Fo"

It is to be hoped that the National Government will make it possible for this sum to become available for railway purposes. China needs railways, highways, airways more than anything else at this time. China needs means of communication. There might be a slogan, a wise slogan—Railways first !

Engineering Notes

ELECTRIC LIGHT, POWER AND TRACTION

CHOSEN SUIRYOKU DENKI K.K. (Korea Hydro-electric Power Co.).—With the completion of the Tsutsui Power Plant this company's "first term of construction" came to an end.

The second term of contruction provided for the building of the Shoko Power Plant, but it is now reported that due to the company's sound financial backing, a Rayon company with a capital of Y.10,000,000 will be built as well.

The Power Station at Shokori is to be completed in June this year. It was built to supply power to the Chosen Nitrogenous Fertilizer Co.'s mills. The chief feature of this plant is that the water supply is obtained by daming one of the tributaries of the Yalu River and forming it to run backwards. This plant has already been equipped with four 36,000 k.v.a. horizontal type generator. Two more power plants are now under construction as part of the "second term" of construction work. They are situated below the first plant, the second plant having an effective head of 700 feet, the third of 300 feet.

The machine equipment of these power plants has been the center of interest to makers all over the country. At the first plant, the rotary converters and switchboards were manufactured by Siemens: the transformers by Shibaura Engineering Works. But at the second plant the equipment is reversed. Shibaura makes the rotary converters, and turbines, and two generators of 23,000 k.v.a. 450 r.p.m., 60 cycles, the automatic starters and brakes. The transformers are being made by Siemens.

In the third plant, which is automatic, the turbines and one generator of 20,000 k.v.a., 275 r.p.m., 60 cycles, vertical type and automatic switchboards have been ordered from Shibaura.

RAILWAYS

HAILUNG-KIRIN RAILWAY COMPLETED.—The new Hailung-Kirin railway in Manchuria is now completed and through traffic commenced on May 15. On that day the last section, from Kirin to Chaoyangchin was formally opened, this last section being 174 kilometres long.

NANKING'S RAILWAY PROJECTS.—Two reconnaissance parties are being sent out by the Ministry of Railways—one for the proposed Yunnan-Changsha line headed by Chou Liang-ching, and the other for the proposed Yunnan-Canton line headed by Li Yao-ching. Mr. Chou is a technical expert of the Ministry and has been with the Paotao-Ninghsia Railway.

Two other parties are being sent out by the Ministry to conduct an economic investigation in various provinces through which new railways will run.

The first party consisting of four technical experts headed by J. H. Ling is covering Fukien, Hunan and Kiangsi provinces, where lines are projected between Nanking-Canton Foochow-Nanchang, and Shiuchow-Nanchang.

The second party of technical experts headed by Chang Fu-chuan is *en route* for Yunnan, Kuangsi and Szechuan provinces, through which lines are projected between Canton-Yunnan, Changsha-Yunnan, Liuchow-Chungking, and Pao-ching-Chinchow.

These two parties are to study the economic functions and revenue-earing possibilities of the lines. The investigators have all undergone intensive training at the Ministry for the tasks they have been allotted, and has been given a special course at the Central University here on agricultural economics. Mr. Chang Fu-chuan is a mining engineer and geologist and was specially appointed to head the second party in view of the rich mineral products in the Yunnan-Kuangsi-Szechuan regions.

NEW JAPANESE RAILWAY LINES TO BE OPENED DURING 1929.—According to the Japanese Department of Railways, the construction estimate of 1929, Y.80,000,000 is distributed as follows:

Distribution of Construction cost for 1929:

Location of local construction office	Amount
Hokkaido	Y. 9,191,484
Morioka	4,698,430
Akita	2,537,028
Nagaoka	8,711,473
Tokyo	6,895,824
Gifu	8,909,316
Yanago	5,765,824
Okayama	6,217,665
Kochi	1,850,625
Yamaguchi	3,114,740
Kumamoto	7,470,942
Atami	24,750
Main Office:	
Materials:	7,448,479
Cars etc:	4,161,000
Cost of construction on contract..	2,492,420
Electrification of Joetsu Line: ...	500,000
Total:	Y.80,000,000

It is also reported that the line to be opend this year number 41 with a total milage of 327 miles, as follows:

Location	Milage	Date of Opening 1929
Marifu—Iwakuni	2.3	April 4,
Hida Kanayama—Yakeishi ...	5.6	,, 14,
Niimi—Iwayama	5.2	,, 14,
Awa Kamogawa-Kazusa Okitsu	9.7	,, 15
Kii Yura—Gobo	5.1	,, 21
Higashi Hagi—Nako	7.4	,, 21,
Sanuki Takarada—Awa Ikeda .	12.1	,,
Nishitojo—Takarabe	4.2	,,
Sasagawa—Yatagawa	5.3	May
Matsuzaka Gongenmae	4.3	July
Kuniwake Kuniwake Machi .	1.6	August
Marusefu—Shirataki	12.2	,,
Orikabe—Kesennuma	7.6	,,
Sendai—Aiko	9.5	September
Fukato—Hachimam	5.2	,,
Ecchu Hachi—Sasatsu ...	5.1	,,
Shinano Omachi—Yanaba ...	7.0	,,
Hyocha—Deshikutsu	15.7	,,
Shari—Fudatsuru	12.2	October
Takadomari—Horokanai ...	10.2	,,
Ajigasawa—Akaishi	4.0	,,
Araya Shinmachi—Tayama ...	7.3	,,
Obihiro—Nakahoronai... ...	17.5	November
Kamikawa—Nakakoshi ...	7.6	,,
Harada—Chikuzen Uchino ...	9.2	,,
Kuninui—Chikobe	10.3	,,
Kohato—Furuichi	2.5	,,
Ohara—Otaki	9.9	,,
Bingo Nakamura—Mori ...	6.2	,,
Tomakomai—Saruta	25.9	December
Gongenmae—Izeki	5.4	,,
Toyooka—Kumihama ...	7.4	,,
Hizen Yamaguchi—Ryuo ...	6.1	,,
Gunke—Hayabusa	2.8	,,
		1930
Hitachi Taishi—Higashidate .	9.5	January
Rikuchu Yagi—Kuji	13.6	March
Mihara—Sunami	3.2	,,
Kisarazu—Kururi	14.1	,,
Iyo Matsuyama—Gunchu ...	7.2	,,
Imari—Yamashiro	3.5	,,
Bicchu Kamishiro—Yagami ...	6.2	,,

ELECTRIC RAILWAY TO OSAKA.—The long-discussed plan for a highspeed electric railway between Tokyo and Osaka, has reached the point where formal application for permission to construct it has been filed with the Government Railways Department, according to the Osaka Mainichi. The line is to be completed within five years from the date formal permission is obtained.

It is proposed to reduce the time of the trip from Tokyo to Osaka to six hours by means of the electric line. Powerful electric locomotives, capable of doing 50 miles an hour, will be used on a broader guage track measuring 4.85 feet in width. Terminal stations will be constructed at Shibuyamachi in Tokyo and Noemachi in Osaka with intermediate stations in Nishi, Yokohama, Gotemba, Shizuoka, Kita Hamamatsu, Okazaki, Nagoya Kameyamachi and Kita Nara.

The project is being handled by a specially organised company including 300 prominent business men of Tokyo, Osaka, Nogoya, Yokohama and other cities in the Tokaido. The organization is captialized at Y.250,000,000. Prefectural authorities in all of the Prefectures through which the line will pass are said to have given the necessary approval to the scheme.

INDUSTRIAL

JAPAN PARAFFIN CO., LTD.—The S. M. R. Co.'s new venture in the shape of the paraffin factory located on the premises of the Asahi Petroleum Co. (about 70,000 tsubo) in Oshima Peninsula opposite the town of Tokuyama, Suo Province, Yamaguchi Prefecture, near Shimonoseki, the shares of the new Company have been paid up in full, and the founders' general meeting is to be held shortly.

The Company will be styled the Japan Paraffin Co., Ltd., with the capital of Y.2,000,000 in addition to Y.1,300,000 loaned by the S. M. R. Co. All the shares have been taken up by the Railway Co.

The Directorate comprises Sales Superintendent Ogawa of the S. M. R. Co. and Dr. Katayama in the service of the Fushun Collieries, and Messrs. Mizutani and Honda, both in Tokyo.

Efficiency Chief Mukaibo and Auditor Kanamaru of the Railway Co.'s General Offices are Auditors.

The old factory will be used subject to major alteration and re-equipment.

The work will begin on May 9, to be finished in half a year. Manufacture of paraffin will commence in November.

According to the plan, the new installation will cost Y.1,700,000. Necessary machinery is ordered from a Czech factory. The new factory will have the floor space of about 1,000 tsubo.

From crude paraffin of 15,000 tons to be supplied by the Oil Shale Factory, Fushun, 7,500 tons heavy oil and 6,600 tons paraffin will be put out. As the Fushun Factory extends its scale of operation, the paraffin factory, too, will be correspondingly enlarged.

MITSUBISHI TO ESTABLISH RAYON COMPANY.—It is reported that the Mitsubishi interests have been interested in Rayon for some time, and looking for a favorable opportunity to establish a new company.

The present report is that a new company to be called the Nippon "Berberg" Kenshi K.K. (Japan "Berberg" Rayon Co., Ltd.) will be established with a capital of Y.10,000,000, as a subsidiary to the Nihon Chisso Hiryo K.K., another Mitsubishi affiliation.

The interests involved are Japanese and German.

In 1928 the total production of rayon is given as 16,900,000 pounds. The total authorized capital of all companies producing rayon as Y.87,000,000.

Experts say that the Japanese Textile industry has not yet-used rayon as raw material up to a total of one per cent. of all raw materials used. The industry can easily bear 10 per cent. though the changes will work hardships on cotton and silk possibly. The Japanese taste like that of the Occident is slowly turning toward the present fashions regardless of their durability, and therefore rayon has its chance to advance in Japanese.

DO NOT CUT

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

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遠東時報

The Chinese Eastern Railway Crisis

By George E. Sokolsky

THE NEW CABINET IN JAPAN

MODERN FINANCING IN CHINA

AMERICA'S SOLDIER-DIPLOMAT

Vol. XXV July, 1929 No. 7

SHANGHAI, PEKING, TOKYO AND MANILA

The Far Eastern Review

ENGINEERING FINANCE COMMERCE

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The Chinese Eastern Railway Crisis

By George E. Sokolsky

THERE can be no question but that both China and Russia have no desire for a war. There is equally no doubt but that neither China nor Russia are economically constituted at the moment to conduct a war on the scale which the present preparations would indicate. The current war talk is largely propaganda, designed merely to maintain national prestige, national dignity and to satisfy the more aggressive and bellicose elements in both countries. China wants peace. Russia wants peace. All Powers desire that there should be peace in Asia. Why then should there be this talk of war, these threatening gestures and denunciations, this massing of troops on the frontier?

A little history is good for the soul. In 1924, Dr. Sun Yat-sen invited Russia to assist him in his effort to re-organize the Kuomintang and to establish the Nationalist Government. Comrade Borodin and his associates came to Canton and served with the Kuomintang, particularly in party and military service. The Kuomintang, for a time took on a Communistic complexion, Borodin and his Russian and Chinese associates spreading Communistic doctrines throughout China as part of their effort to destroy the Peking Government. This movement was wonderfully successful, so that by the end of 1926, the Nationalist armies held the whole Yangtze Valley, except the Shanghai-Nanking region which was then controlled by Marshal Sun Chuan-fang. Largely as a result of the activities of Communistically inclined students and laborers, Shanghai fell at the end of March, 1926.

It was during this period that Marshal Chang Tso-lin made his famous raid on the Soviet Embassy in Peking which resulted in a world-wide disclosure of Soviet plots not only in China but in other countries. Marshal Chang's position was unassailable, as Soviet Russia was undoubtedly and openly assisting his enemies in their effort to destroy his government by revolution. Although the Soviet Embassy was closed down, Soviet consular officers remained in China, while Chinese diplomatic and consular officers remained in Russia.

In the South, Soviet domination was found to be abhorrent by General Chiang Kai-shek. Assisted by a group of Kuomintang Generals, notably of the Kuangsi faction, he broke away from the Hankow régime and in April, 1927, he established the at that time separatist Nanking Government, as a direct protest against Soviet Russia dictatorship of the Kuomintang and the continued spread of Communism in China. He joined with him in the Nanking Government such persons as were known to be anti-Communist. The new Government entered upon a Party Purification campaign for the extermination of Communists and this had been rigorously followed to this day, sometimes with surprising brutality. Twice in Shanghai and Hankow all Russian Government economic enterprises were closed down and Russians deported. Even certain Russian advisors were arrested and detained without a fair trial and finally in December 1927, the Russian Consulates in South China were closed down, after the Communist riots in Canton during that month.

All this has been justified on the ground of national necessity. The Communist armies of Ho Lung and Yeh Ting were in South China just as the Communist armies of Chu Teh and Mao Tze-tung are operating on the Kuangtung-Fukien border now. Thousands of Communist students and laborers were agitating against the new Government, which adopted drastic measures to preserve itself.

Had Nanking failed in its anti-Communist campaign, the Hankow Government would have come under Communist domination and South China would have fallen prey to a virulent form of Communism. Even those opposed to the Nanking Government must admit that single fact to its credit.

Although the South terminated all relations with Soviet Russia, the North continued a quasi-diplomatic relationship. This was inherited by the Nanking Government when it captured Peking.

The story of the Chinese Eastern Railway is a long and ugly one. Conceived by the secret Li-Lobanoff Treaty, aimed as an offensive weapon against Japan, it has been throughout its existence a Russian political agent. It served Russian imperialism in Czarist days; it serves Russian imperialism in Communist days. If Nanking claims that it has been used as a vehicle to spread Communism, that will surprise no one, nor will it matter much. The whole history of the Chinese Eastern Railway is a history of political service for Russia—for Russia of whatever complexion.

The vicissitudes of the Chinese Eastern Railway since October 1917, when Soviet Russia came into existence, have painted a drear page in Far Eastern history. Controlled by an Allied Commission for about a year, it eventually reverted to a Sino-Russian partnership in accordance with an agreement signed between China and Russia in 1924. There can be little question but that Russia has failed to live up to the terms of that agreement. China undoubtedly has had a grievance and a case. China would probably have won her case in any international tribunal.

The seizure of the Chinese Eastern Railway by the local Manchurian authorities has undoubtedly spoiled China's case, for it was accompanied by a rather senseless propaganda that China would unilaterally abolish extraterritoriality at the end of 1929. It is difficult to believe that the best minds in Nanking favored the seizure of the railroad or the particular form of anti-extraterritoriality propaganda which some of Nanking's statesmen were issuing. At any rate, both coming at the same time created the unfortunate impression that Nanking was growing irritable and restless and that her foreign policy was reverting to the Hankow days of Mr. Eugene Chen. Although throughout the world there is more sympathy for China than for Soviet Russia, the issue immediately narrowed itself down to the single one that whatever *changes are to be made in China's treaties and agreements, they shall be made by negotiation and not by unilateral declarations and seizures.* That the leading men in Nanking hold that view is apparent from General Chiang Kai-shek's statement that China will not attempt to abolish extraterritoriality by force.

In addition to this question, the Russians have raised the issue of the use by China of "White" Russians for political and military purposes in Manchuria and Mongolia. Attaman Semenoff's name looms large in this connection and whoever is responsible for his employment, if he is employed on behalf of China, has done his country infinite mischief.

The whole problem can thus be summarized:

1. Soviet Russia demands that the question of the Chinese Eastern Railway shall be settled by negotiation and not by seizure of the railroad.

2. China demands that Soviet Russia shall cease Communist propaganda and political activities in China.

3. Russia demands that China shall not use "White" Russians to disturb the Sino-Soviet frontier.

Surely such issues can be settled without a resort to arms! Surely there can be "peace with honor" in any solution of these questions. China needs peace and time to work out her problems of reconstruction. Russia will not benefit from a weakened and chaotic China.

All the requirements of this situation indicate the need for peace. Yet men talk of war. Both nations might practice some of the much vaunted realism of which revolutionaries boast so; both nations can easily climb down from their intransigeant altitudes; both nations can meet about a table and negotiate for an adjustment of outstanding issues with dignity and honor. There is enough right and wrong on both sides to make that politically possible.

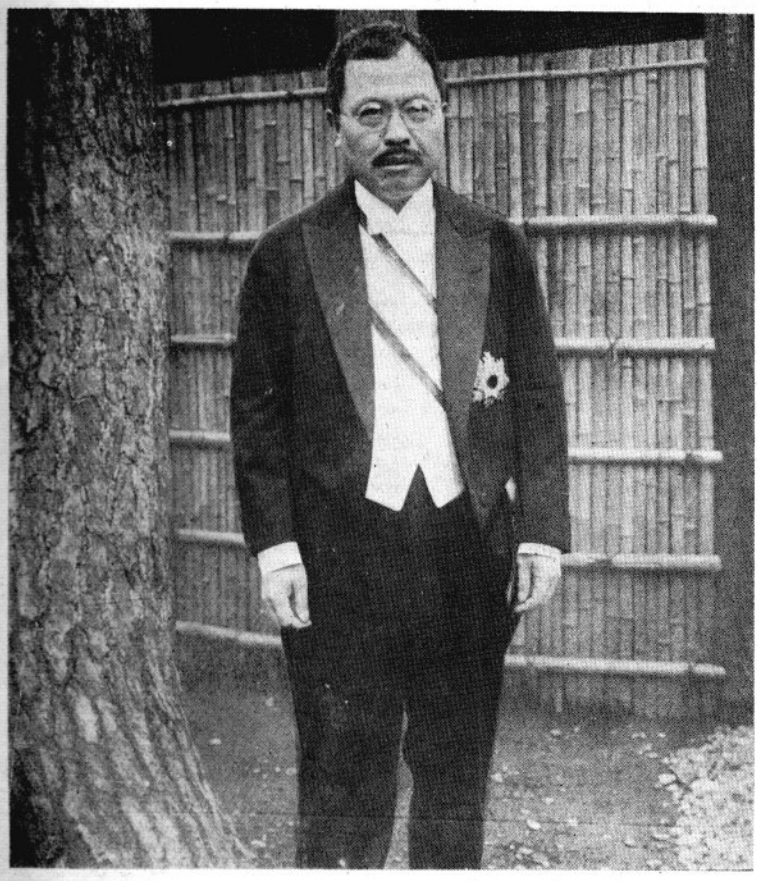
The New Japanese Cabinet

FROM the standpoint of the foreigner, the new Japanese Cabinet shows strength in its personnel, particularly in the Ministries of Foreign Affairs and Finance. The recent Tanaka Cabinet functioned without a Minister of Foreign Affairs, the Premier holding this portfolio himself. In the present Cabinet, the portfolio of Foreign Affairs has been given to Baron Shidehara, who has already won an enviable reputation for himself, not only as a Japanese diplomat but also as an independent political thinker who has been viewing Japan's position, particularly *vis-a-vis* the United States and China from a new standpoint.

Baron Kijuro Shidehara was Ambassador to the United States from 1919 to 1922, from the period of intensive anti-Japanism in America to the period immediately following the Washington Conference when the American suspicions of Japan were wholly allayed and an era of good-will and understanding ushered in. Not even a political enemy can minimize the services which Baron Shidehara rendered his country during those trying days.

The post-war political reaction in the Far East involved an intensified campaign againt Japan in the United States. Japan held the former German possessions in Shantung; Japan was protecting herself against the spread of Communism to China and Japan *via* the Chinese Eastern Railway; student demonstrations had prevented the Peking Government from signing the Versailles Treaty and inaugurated in China a fierce anti-Japanese boycott; the renewal of the Anglo-Japanese Alliance was in the balance.

Americans in China—most foreigners in China—were prone to regard Japan as an aggressive ally, who had sought to use the war situation to wrest territory on the mainland of Asia. A combination of resentment over specific acts, racial prejudice and a desire to preserve the territorial integrity of China, stirred in the United States an enmity towards Japan, rarely witnessed in a friendly country. Certain Americans in Asia and in the United States openly advocated war with Japan. It was in such an atmosphere of suspicion that Baron Shidehara won his spurs in the creation of such a friendship as exists between the United States and Japan to-day. The culmination of it was the Washington Conference, which ended forever any possible misunderstanding between the two countries and at this conference, although Baron Shidehara was not the head of the Japanese delegation, he often acted as the spokesman. And it is most interesting to note that whenever questions of China arose, it was Baron Shidehara who presented the Japanese point of view, he being regarded even then as an expert on Chinese affairs. His first speech at the Conference was short but exceedingly notable. There has been a desire to humiliate Japan by forcing her to assent to an international settlement of



Baron Shidehara, Minister of Foreign Affairs

Mr. J. Inouye, Minister of Finance

Railway Economics for China

By H. Stringer

THE Nationalist Government having embarked on a program of reconstruction, in which improvement of communications takes perhaps the most important place, it is of the utmost importance that the initial steps taken to this end shall be in the right direction.

In the first place, there must be no dispersal of effort. There have been indications of a recurrence of the disease of provincialism in railway projects which the past has shown to be so expensive. The policy of centralized control of railway policy initiated in 1911 was unquestionably a wise one and nothing should be done to reverse it. The enthusiasm for aircraft, in the present state of China's foreign credit, must be classed as entirely false. It is a toyshop need to be sternly suppressed as of little commercial value. China must confine herself rigidly to essentials, the completion of the Canton-Hankow and the Hankow-Szechuen Railways are the first of these. Then she must revive from their derelict and unproductive state those railway projects on which money has already been spent. These are as below :—

	Approximate Expenditure
Hankow-Szechuen	£1,000,000
Pukow-Sinyang	207,000
Nanking-Hunan	200,000
Ching-Yu Railway	1,085,000
Pin Hui	100,000
Peking-Suiyang Extension...	800,000
	£3,392,000

At the present time the study of economy is of paramount importance. This being so the study of the science of railway location should receive far more attention than has been given to it in the past. There has been too great a tendency in the past to cling to the vicinity of the old highways. This is of small importance in easy country, but in country of any difficulty it may lead to most costly mistakes. The Peking-Kalgan Railway is a case in point. Generations of engineers will bewail those costly 1 in 30 gradients, which have added an enormous yearly tax on operating costs with no compensating advantage of possibility of drastic deviation without huge capital expenditure. To quote a Chinese proverb which is applicable to life and railway location : "The error of one moment becomes the sorrow of a lifetime."

Then economy can be effected by adopting new standards of railway construction, but this is a policy which should be carefully considered in the light of experience of local conditions.

After obtaining the best possible route for a railway the factors governing carrying capacity are in order of importance (1) gauge, (2) railway weight and road bed.

Saving in construction costs could be effected by the adoption of a narrower gauge, say metre or 3-ft. 6-in, but this would be extremely unwise.

In the first place China should, after the completion of the two trunk lines mentioned above, concentrate her energies on the provision of an adequate railway system for that portion of the country where construction would be cheapest, population is greatest, and profits adequate and rapidly earned. This district is known as the Great Plain of China which covers an area of 210,000 square miles and has an estimated population of 625 persons to the square mile—the densest in the world. The Plain is bounded by a line which runs from Shasi to Peking in the west, its eastern boundary being the sea. In all this area good location should give curves of 1,000 feet radius and gradients not exceeding 1 in 120, and earthwork should not be a heavy item. This implies that one of the main savings to be expected from the adoption of narrow gauge is at once eliminated. In fact it is calculated that the saving from the adoption of 3-ft. 6-in. gauge in this area would not exceed 7 per cent. on the capital cost of 4-ft. 8½-in. gauge. Even though the narrow gauge line would have, with similar rail weight, almost the same capacity as the standard gauge, the certainty of congestion at transhipment points should rule out the paltry saving effected. The experience of the world is against the adoption of mixed gauges, and it has been found in India that the working expenses of metre gauge are 25 per cent. more than the 5-ft. 6-in. gauge. Even in heavy country where gradients as high as 1 in 40 and 300 foot curves might have to be adopted, and where the case for narrow gauge was probably a strong one, the advent of the motor tractor has altered the situation entirely and it is now questionable whether such areas would not be best served by good motor roads unless there are great mineral possibilities. With the exception of one short railway, China is so far committed to standard gauge and she should not abandon it.

The economy to be effected from the adoption of a lighter rail is not so certainly disposed of. China has no steel industry which can be called her own. Her steel industry, which is quite inadequate for her railway needs, is in Japanese hands and Japan can absorb all the output. Until China elects to produce the cheapest steel in the World, economy in this material is a vital consideration as at least 30 per cent. of the cost of railways is for materials of which steel is the basis, the principal item being the rails whose weight largely controls the capacity of the line. The case for the 60 lb. rail as against the 85 lb. rail can be stated as follows :—

Difference in cost per mile of road bed :—

85 lb. rail		60 lb. rail	
156 tons steel at £10 ($120) ...	$18,720	112 tons steel at £10 ($120) ...	$13,440
900 fang ballast (8-in. under)	4,050	700 fang ballast (6-in. under)	3,150
50 miles carriage on ballast		2,500 (4/2d) in trucks at quarry.	
2,488 sleepers (14-ft. to 30-ft. rail) $2.50 (4/2d each	6,220	2,112 sleepers (12-ft. to 30-ft. rail)	5,280
Total cost per mile ...	$28,990 (£2,420)		$21,870 (£1,827)

Now the maximum capacity of a single line of railway in the District of the Great Plain is, for a railway equipped with a 60 lb. rail and stations at five mile intervals, about 4,300* tons daily or 1,680,000 tons yearly. This is the capacity for a length of line dependent on the average haul which averaged 184 kilometres or 115 miles for the whole Government system in 1918. In this year the Railways carried 632,040 tons over a length of line equal to this average haul, indicating that the 60 lb. rail would be adequate for initial needs for many years as the mileage concerned had been in operation for an average of about 5 years at this date.

The saving stated above does not represent the total saving by any means, for the economy in the cost of steel work in bridging would be a very considerable item even if the larger bridges, where replacement would be difficult under traffic, were built for the 85 lb. rail. Further, when the heavier rail became necessary, the 60 lb. rail together with the bridges for this weight of rail could be reused for feeder lines.

It will be seen that the cost of stone ballast amounts to 7 per cent. of the total cost of the road bed, and economy might be effected in using sand or gravel, or selected material from borrow pits, as has been done in tropical Africa and South America. This would, however, be a doubtful experiment in a country where even the initial train density is high. Further, though the rainfall is not so torrential or continuous here as in tropical Africa, train density in that country, where this policy has been a success, would not exceed at most two per day.

*The figures for capacity are derived in the following way and rest on the assumption that grades in this district would not exceed one in 120, a very reasonable hypothesis. On this basis and with stations as above a maximum of 32 goods trains out of a possible 36 is assumed, the remainder being passenger trains. Each goods train would consist of about 62 axles with a car capacity of 370 tons of which only 37 per cent.—a distinctly low figure—is taken as paying load. This gives a daily tonnage over a length of line depending on average haul of 4,300 tons as above.

The sleeper question also needs serious consideration. At present the Jarrah sleeper with a proved life of about 25 years in the Shanghai district is undoubtedly the best investment for China. The initial cost is undoubtedly high, but with an uncertain political future only the best materials should be used in the construction of the most vital portion of the railway organism. The day of the steel sleeper will not come until China has reorganized her steel industry, or until there is a further rise in the price of this class of timber sleeper.

The question of feeder lines to the existing system should also receive immediate attention as under 8 per cent. of the existing mileage now falls into this class indicating that there is a large undeveloped field for expansion. How large this field is can be judged when it is seen that no railway in the country has yet reached maximum capacity for single line traffic. Much also might be done in this direction until China can afford to spend money on such railway development by the construction of a road system to feed the existing railways. It is estimated that adequately metalled roads could be constructed in the District of the Great Plain where there would be long haulage on stone at a cost not exceeding $13,000 per mile, whereas a railway equipped with a 60 lb. rail would cost not less than $90,000 per mile. In adopting such a road policy China would only be following generally accepted practice elsewhere. She would also provide opportunities for her surplus labor and create an increased demand for entirely local materials.

The adequate provision of rolling stock also needs careful scientific consideration. The question of what is adequate or inadequate in this respect is a thorny one, but it appears that it should be considered from the following point of view. Thus take the case of a line equipped with 60 lb. rail, single track with crossing stations at five mile intervals and with a limiting grade of one in 120. Goods trains on such a line would not exceed a car capacity of 400 tons and if we assume that freight is 50 per cent. of capacity hauled, tons of freight per train should be 200. Then if the average haul is 100 miles, each 100 miles of line should be equipped with a car capacity of 400, multiplied by the number of necessary trains obtained by dividing the daily tonnage available by 200 tons. This number of trains is, of course, limited by line capacity which is, say, 32 goods trains out of a daily total of 36—four being passenger trains—for a single line as above. Thus the maximum daily capacity of a single as above is about 6,000 tons per 100 miles and for this 12,000 tons of car capacity is required or four 4/30 tons cars per mile. Passenger stock can be treated on the same basis with an assumed relation between seat mileage hauled and seats occupied, generally about 25 per cent. The above, of course, assumes a daily motion of 100 miles per car and neglects stock not in motion. This might be true for passenger stock only on double track lines, but for goods stock is incorrect for single track lines at least, and probably double track. Thus in the U.S.A. daily movement per wagon is 28.1 miles with a 30 ton load while in Japan it is 58 miles, and in England about 15 miles and one ton. Figures for goods stock should thus be increased.

Of minor constructional economies the most important one is the elimination of the high level platform and the provision of planking platforms between track at stations. This leaves station layout on that more flexible basis which is a necessity for railways in new country.

The provision of a lighter rail is the one economy which would seem to be entirely sound policy

The New Japanese Cabinet

(Continued from page 291).

anti-foreign movement developed in China, including the Japanese as well as the British. It required great tact and an understanding of the Sino-Japanese situation to prevent this movement from involving Japan in an open and prolonged conflict with China, particularly as Japan's special interests in Manchuria made occasional direct interference in Chinese affairs, whenever the peace of Manchuria was endangered, necessary and inevitable. Throughout this period Baron Shidehara proved himself to be not only a great statesman but a friend of China.

His present colleague, the Minister of Finance, Mr. Junnosuke Inouye, has always been regarded as the eventual successor to Viscount Shibusawa, as the Financial leader of Japan. He is an ex-Governor of the Bank of Japan, but undoubtedly his greatest service was the up-building of the Yokohama Specie Bank, of which he was vice-President from 1911 to 1913 and the President to 1919. In a word, he directed the affairs of this wonderful institution during the entire War period, when Japan reached an amazing prosperity.

Mr. Inouye has also played a signal part in the development of friendship between the United States and Japan. After the Versailles Conference, there was a determination on the part of Americans that the spheres of influence which forced American banks out of China, should come to an end, that instead of cut-throat international competition, there should be international co-operation in financing the reconstruction of China. The only two countries which had enough money to do the job, at that time, were the United States and Japan. If they co-operated, they would have to carry their partners; if they chose to compete, each could do the job alone. There was a feeling in most countries, that Japan would refuse to join the Consortium. Japan made certain reservations, which were wholly misunderstood but with regard to which, Mr. Lamont said :—

> It has sometimes been alleged that the insistence of Japan on the reservations regarding Manchuria and Mongolia is due to her policy of aggression and that she has thereby delayed the formation of the Consortium. That is a conjecture entirely devoid of foundation. The demand for the insuring of the right of self-preservation, with a view fundamentally to the requirements of national defense and of the economic existence of the nation, represents a serious national sentiment, and should by no means be regarded as emanating from the political ambition of a small section of the people.

It was Mr. Inouye who made the successful organization of the Consortium possible. As soon as he agreed that Japan would join this body, Mr. Thomas W. Lamont, its Chairman, visited Japan and China. To Mr. Inouye must go the credit of bringing Japan into harmony with America's financial program in China upon which depended to such a large extent the peace of the Pacific.

It is a remarkable fact that at this moment the two Cabinet officers who will have so much to do with American-Japanese relations (which are increasingly financial as the United States invests increasingly large amounts in Japanese enterprises) should have laid the foundation upon which this mighty structure of friendship has been erected.—G.E.S.

Correspondence

[In the May issue of the "Far Eastern Review," we published the report of the Commission appointed to investigate the Shanghai-Nanking Railway. Mr. A. C. Clear, formerly General Manager and Engineer-in-Chief of the Railway, who resigned since the report was made, has sent us the following letter :]

Shanghai, June 20, 1929.

My Dear Sir,

I thank you for calling my attention to the Article in your May 1929 issue on the Shanghai-Nanking Railway.

There has been no public statement of this case by the individuals concerned as it was not contemplated that the findings of the Commission would be taken at more than their face value.

When, however, a journal of such high repute as yours gives publicity to this document it is necessary to reply.

At the outset the personnel of the Commission was protested against by the British and Chinese Corporation, whose claim to be represented was ignored, although the Railway is defined in its Loan Agreement as "the joint enterprise of the Chinese Government and of the British and Chinese Corporation." Neither was the principal executive officer of the Railway, *i.e.* the General Manager, called upon to give evidence. No attempt was made to find out the difficulties experienced through lack of Capital Funds, ignoring that for the past nine years continuous effort had been made to obtain money for essential needs.

No allowance was made for the numerous evils and damage attendant upon military occupancy of the railway, throughout which the staff was continuously subjected to various forms of intimidation and physical danger. In fact the report is prejudiced and deliberately misleading. Much of it is founded on ignorance

Engineering Notes

ELECTRIC LIGHT, POWER AND TRACTION

KYOTO MUNICIPALIZES ELECTRICAL ENTERPRISE.—Mayor Toki of Kyoto city and Mr. Tanaka, president of the Kyoto Electric Light Company, came to an agreement as regards the municipalization of the electric light and power enterprises in the city.

The negotiations, which were opened during April, have so far made smooth progress, and they agreed upon main points of the Kyoto city's proposal a few days ago. At this interview between the Mayor and the President of the Company, the price at which the Municipality is to take over part of the company's enterprise was agreed upon. In the course of the coming few days, they will talk on minor points of the proposal, such as the question of procedure of the municipalization, and then, a provisional contract will be signed.

The enterprise of the Kyoto Electric Light Company which Kyoto city is going to take over consists of the electric lights supply numbering 542,300 pieces, power supply mounting to 35,000 h.p., and 10,000 k.w., of power for electric heaters.

SHINANOGAWA DENKI K.K. (Shinanogawa Electric Co., Ltd.) The Togiigawa Hydro-Electric Power Station, automatic, of this company has been improved recently by installing an additional unit of 2,500 h.p. water turbine, dynamo of 2,500 kva, 66,000 v., 60 cycle. The new equipment is going very nicely, it is reported. The maker is Shibaura Seisakujo.

TOKYO DENTO K.K. (Tokyo Electric Light Co., Ltd.)—Tokyo Dento has decided to buy two electric power companies: One Katsuragawa Denki Kogyo K.K. (Katsuragawa Electric Development Co., Ltd.) capital Yen 2,000,000, Yen 1,000,000 paid in, and the other Fuefuki Suiden K.K. (Fuefuki Hydro-electric Co., Ltd.), capital Yen 1,250,000, all paid in.

The purchase price of the latter company is not yet known. For Katsuragawa Denki Kogyo, Tokyo Dento will hand over Yen 1,340,000 shares owned by Toden Shoken K.K. (Other details unknown).

RAILWAYS

TWO BRANCH LINES IN MUKDEN COMPLETED. The Peking-Mukden railway has recently completed two short branch lines in the vicinity of Mukden. One goes to the Pei Ling, Northern Imperial Tombs and the other to the Tung Ling, or Eastern Imperial Tombs, the intention being to facilitate communication to these beautiful and interesting spots.

The line to the Pei Ling has already been opened for traffic, elaborate ceremonies marking the opening day.

The opening of the line to the Tung Ling has met with unexpected delay. The line passes through the grounds of the North Eastern University and for reasons not known the students objected to its presence. A body of them, therefore, proceeded to tear up a section of the track. Negotiations between the university heads and the railway authorities are now proceeding.

CONSTRUCTION OF FORESTRY RAILWAY LINE.—Having decided to establish a forestry railway line at an estimate of 1,800,000 spread over three years, the Forestry Department of the Chosen Government-General will start the first stage of the line, 18 miles in length, about the middle of June next at the cost of Yen 700,000. It is understood the entire length of the line will be 40 miles, of which 18 miles will be completed in 1930 and the remainder in 1931. On completion the line will have a transport capacity of 200,000 *shakuime* of timber a year.

CONSTRUCTION OF LIGHT RAILWAY BETWEEN KHUNCHUN AND TOMEN.—Acting upon the twelve-year plan for construction of the Tomen East Railway Line, connecting Yuki with Tung Kwanchen 97 miles in length, work on the section between Yuki and Shinazau was started in October the year before last and is expected to connect with the Tomen West Line in 1931. Khunchun Prefecture of Kirin Province, on the far side of the Tomen, is 260 square *ri* in area and with a population of 80,000 annually produces over 400,000 *koku* of grain. About 50 per cent. of the population is Korean and trade through Hsia Juping, Keigen and Ryudo, is yearly on the increase, the total last year exceeding Yen 3,000,000 or 90 per cent. of the total amount of trade. The lack of means of communication save by the Rivers Tomen and Khunchun is the great obstacle to the gathering and distribution of its products, so completion of the Tomen railway line will put a new face on affairs, so attention is being paid by the Chinese authorities as to the location of a new station to be established by the Railway Bureau on the Tomen. On the other hand a plan is on foot for construction of a light railway line from Khunchun to Tomen, and the promoters are now approaching the Kirin Provincial authorities for permission. There are at present three plans, 1. From Khunchun to Hsunchieh via Yung Wantze, 2. From Khunchun to Keigen via Shatotze, Ryuta Island, Jyosen, 3. From Khunchun to Ryudo via Hokuang. Viewed from the stand-point of physical features, construction of the first line is the easiest but lack of means of communication between Hsunchieh and Keigen is against it so the second one bids fair to be adopted.

NEW TSITSIHAR-KOSHAN LINE.—As previously reported, the Tsitsihar government, in order to raise sufficient private capital for laying the new Tsitsihar-Koshan line with, announced some time ago to the people of Koshan and Paichan Prefectures that whichever Prefecture would put up $300,000 ahead of the other for the construction costs should be privileged to get the main line built in that Prefecture.

THE PROPOSED HANGCHOW-KIANGSHAN LINE.—A project for the construction of a short railway line in Chekiang linking Hangchow, the Provincial capital, with Kiangshan, in the southwestern corner of the Province, has been prepared by Mr. Chang Ching-kiang, Chairman of the National Reconstruction Committee and concurrently Chairman of the Chekiang Provincial Government, for submission to the National Reconstruction Committee. The cost of construction of the proposed railway will be borne entirely by the Chekiang Provincial Government, but the construction will be supervised by the National Reconstruction Committee.

RECONNAISSANCE PARTIES ON WAY TO YUNNAN.—Two reconnaissance parties are being sent out by the Ministry of Railways—one for the proposed Yunnan-Changsha line headed by Chou Liang-ching, and the other for the proposed Yunnan-Canton line headed by Li Yao-ching. Mr. Chou is a technical expert of the Ministry and has been with the Paotao-Ninghsia Railway.

HANGCHOW-NANCHANG, HANGCHOW FOOCHOW AND HANGCHOW-ANKING LINES PROPOSED.—The Province of Chekiang will be laying down tracks for three inter-provincial railways with Hangchow as the central point, if plans completed by Mr. Cheng Ching-chun, Provincial Commissioner of Reconstruction, can be carried out. The proposed lines will be the Hangchow-Nanchang, Hangchow-Foochow and Hangchow-Anking lines. The project is now under consideration by the Chekiang Provincial Authorities and will be submitted to the State Council for sanction.

NEW TSITSIHAR-KOSHAN LINE.—Regarding the construction of the Tsitsihar-Koshan Line, North Manchuria, the earthwork has been finished up to Taianchen, while the rail-laying work has been pushed as far north as three miles from Tubaerhchan. At present, 100 men are put on the construction of a wooden bridge over the Wukoerh river.

FUJI SANROKU ELECTRIC RAILWAY COMPANY CONNECTS OTSUKI AND YOSHIDA-GUCHI. The opening took place at Yoshida, Fuji on June 23, of the most modern rapid transit railway in Japan laid between the Otsuki Station on the Chuo Line of the Government Railways and Yoshida-guchi at the foot of Mount Fuji, by the Fuji Sanroku Electric Railway Company, Limited, which was formed with the object of exploiting the great scenic resources which lie on the skirts of Fuji, hinging around Fuji's five lakes.

LUNGHAI RAILWAY PURCHASES.—It is officially announced at the Ministry of Railways to-day that an amount totalling £349,625, from the Belgian Boxer Indemnity Fund, has been spent by the Lunghai, Railway for the purchase of cars, locomotives and other railway materials. The amount which had been allotted to the railway from the Belgian Boxer Indemnity Fund was £370,487, thus leaving a balance of approximately £20,862 which amount will probably be used for purchasing rails and other materials for the western section of the railways. The purchases made are as follow:—

First class and second class cars, dining cars and sleepers	£40,284
Freight cars	4,190
Railway bridges	14,820
Steel Sleepers	30,432
Railway bridges	28,200
Rails	108,620
Water Feeders	4,490
Telephones	305
Dining car and sleeper equipment ...	2,440
Pipes	650
Miscellaneous materials	12,300
Locomotives	73,000
Miscellaneous materials	15,700
Miscellaneous materials	14,400

MORE UNDERGROUND RAILWAYS PLANNED. The steady increase in the city population is now an important factor which encourages reorganization of traffic system. At present there is only one underground railway which is operating; Tokyo Chika Tetsudo K.K. (Tokyo Underground Railway Co., Ltd.) in Tokyo between Asakusa and Ueno, but there are several plans now under way: Osaka Municipal Underground Railway, Tokyo Municipal Underground Railway, a new plan to connect Aichi Denki Tetsudo and Nagoya Tetsudo by a subway in Nagoya.

In addition to these, two new plans are reported, one in Kobe and the other in Nagoya. The necessary license has been applied for already, and the Department of Railways is likely to grant it, considering the future development of traffic in big cities.

The Kobe Underground Railway Co., Ltd. (Kobe Chika Tetsudo K.K.) now being promoted is to be capitalised at Yen 29,000,000. The mileage is 7 miles 45 chains, between Nishi Suma and Sumiyoshi Machi and between Nishi Suma and Fukinigawa. Promoters include Mr. Gisaku Takikawa and 12 other noted businessmen.

The Nagoya Chika Tetsudo K.K. (Nagoya Underground Railway Co., Ltd.) is to have a capital of Yen 12,000,000; section, Atsuta Machi to Sasajima Machi, Nagoya, 44 miles. Promoters are: Jusuke Tomita, Kiyonari Ayukawa, etc. (For more data on this company, see Our Service No. 506, dated May 21, 1929). (Taken from Denki Nippo).

PROJECTED KALGAN-DOLONOR RAILWAY.—Construction work on the long-projected railway between Kalgan and Dolonor will commence in six months. The total mileage of the line is four hundred *li*, about 133 miles and the entire cost is estimated at about $4,000,000. Labour from the famine-stricken district will be used for the building of the line.

CONVERSION OF ARMORED TRAIN INTO PASSENGER CARS.—The Ministry of Railways has requested the Military authorities to allow the Ministry to convert the armored cars and armored locomotives formerly used for military transport on the Kiukiang-Nanchang Railway into regular passenger and freight cars and service locomotives respectively for ordinary traffic. It is learned that steps are being taken by the Military authorities to comply with the request.

INSPECTION TRIP MADE.—Mr. H. S. Chuck, Managing Director and Chief Engineer for the unfinished portion of the Canton-Hankow Railway, arrived in Nanking this week to report on his inspection trip over the proposed route linking up Chuchow (in Hunan) with Shiuchow (in Kwangtung province). Mr. Chuck was accompanied by Mr. J. Weir, Consulting Engineer to the Ministry. After reporting and conferring with Minister Sun Fo, Mr. Chuck left Nanking yesterday for Canton, where he will arrange to start construction of the first 31-mile section of the line from the northern terminus of the Kwangtung end. The estimated cost for building and equipping this section will be approximately $7,000,000, and noteworthy engineering features include a bridge of seven spans with a total length of 760 feet at Shiukwan, and a 1,400 feet tunnel at Kaolin, which is about half-finished. Piers and abutments for the bridge have already been completed.

TSUKUBA KOSOKUDO DENKI TETSUDO K.K. (Tsukuba High Speed Electric Railway Co., Ltd.)—License has just been granted for a new line from Umejima Mura, Minami Adachi Gun, Tokyo Prefecture, and Matsudo Machi, Minami Katsushika Gun, Chiba Prefecture, covering a distance of some 7 miles 38 chains. The cost of construction is estimated at Yen 2,150,000 for the entire section.

OSAKA SUBURBAN RAILWAYS PLAN CONNECTION WITH OSAKA MUNICIPAL UNDERGROUND RAILWAY LINES.—All suburban railways in Osaka are planning for connection with the new underground railway lines to be constructed by the Osaka Municipality, the first section running from south to north through the heart of the city to be started before the end of this year.

Osaka Denki Kido K.K. (Osaka Electric Tramway Co., Ltd.) which is operating an electric railway between Osaka and Nara, has applied for a license for one mile of high speed electric railway from the present terminus at 6-chome, Uehon Machi to Nanba via Semnichimae.

In February this year Nankai Tetsudo K.K. (Nankai Railway Co., Ltd.) also applied for license between Ebisu Machi to Nanba via Sakaesuji and Nihonbashi, about one mile, underground line.

On May 24 Keihan Denki Tetsudo K.K. (Keihan Electric Railway Co., Ltd.) applied for the necessary permission for some half-mile underground line from the terminus at Tenmabashi to Tenjinbashi. This line is to be connected with the second section of the Municipal Line which is to start from Noye and terminate at Tennoji Park via Umeda Kushin Machi, Tenmabashi, Matsuyacho Suji. The cost of construction for this plan of Keihan is estimated at some Yen 4,000,000.

As for other railway companies, Hanshin Kyuko Dentetsu K.K. (Hanshin Express Electric Railway Co., Ltd.) and Hanshin Denki Tetsudo K.K. (Hanshin Electric Railway Co., Ltd.) are to connect with the Municipal underground line in front of the present Osaka Station, while the Osaka Tetsudo (Osaka Railway Co., Ltd.) will also get connected directly with new subway lines. Keihan was the last to apply for underground connection, so that every private railway in Osaka is to be connected with the Municipal line.

INDUSTRIAL

NIPPON SEKIYU K.K. (Japan Petroleum Co., Ltd.)—The company has decided to prospect for oil at Gyunikuzaki, Banshasho, Shinyei Gun, Tainan Province, Formosa. Some time ago the company succeeded at Rokujukei fields in the neighborhood of Gyunikuzaki, so that the present attempt is expected to be successful. Prospecting operations will be started on August 10, this year.

NEW GAS COMPANIES LICENSED.—The Department of Commerce and Industry has just granted license for the following two concerns:

Sakaide Gasu K.K. (Sakaide Gas Co., Ltd.) in Kagawa Pref. Authorized Capital, Yen 150,000. Cost of construction estimated at Yen 145,000. Supply District, Sakaide Machi, in Kagawa Prefecture, where the number of customers is estimated at 900. Productive capacity of the plant is rated at 1,400 cubic meters a day. The rate of charges will be 14 sen per cubic motor.

Seto Gasu K.K. (Seto Gas Co., Ltd.) in Aichi Prefecture. Authorized capital, Yen 500,000. Cost of construction estimated at Yen 200,000. Supply district, to cover the whole town of Seto, in Aichi Prefecture, where the number of customers is estimated at 1,200. Capacity of the plant is rated at 1,700 cubic meters a day, and the rate of charges at 14.1 sen per cubic meter.

The chief promoter of Sakaide Gasu K.K. is Gisaburo Kanazawa, that of Seto Gasu Monyemon Kato.

THREE MOTOR CAR COMPANIES TO CO-OPERATE.—Three Japanese motor car manufacturers are reported in negotiation for production and sales agreement. The plan is encouraged by the Department of War, especially, in view of marked activities on the part of foreign manufacturers in Japan. The three concerns are as follows:

Ishikawajima Jidosha Seizo K.K. (Ishikawajima Motor Car Mfg Co., Ltd., recently established to take over the motor car department of Tokyo Ishikawajima Zosenho, K.K. details, see our "Japan's Reviving Industries, page 305). Capital of this concern is Yen 2,500,000, productive capacity about 350 cars a year, including motor trucks and autos, busses.

Tokyo Gasu Denki Kogyo K.K. (Tokyo Gas and Electric Industry Co., Ltd.) — details, see our "Japan's Reviving Industries," page 301, with a productive capacity of 50 cars a year, principally large size busses.

Datto Jidosha K.K. (Datto Motor Car Co., Ltd.), which has a capital of Yen 500,000, and a productive capacity of 50 cars of small size busses.

At present the government is subsidizing this industry to the extent of Yen 500,000 a year.

The agreement now under negotiation is to cover buying of materials, standardization of the type of cars, and sales by discriminating sphere of influence. It is reported that these firms will endeavor to manufacture motor trucks and busses the demand of which is rising every year, the present proportion being about 30 per cent. of the total demanded in Japan a year, 20,000 cars.

STEEL WORKS FOR NEW WIJU.—The proposed establishment of a steel manufactory at New Wiju has made good headway.

On the prospective detachment of the Anzan Iron and Steel Works from the S. M. R. Co. into a separate company, a steel works on the capital of Yen 70,000,000 will be established at New Wiju with a blast furnace of the capacity of 2,500 tons. Then the pig iron and semi-steel materials put out at the Anzan Works will be wrought upon. To facilitate the shipment of the products of the new works, the harbour of Liutaokou, Antung, will be reconstructed at the outlay of Yen 6,000,000.

In order to obtain more materials for the new works, the S.M.R. Co. has approached the Kenjiho Iron Works owned by the Mitsubishis and the Penchihu Mining and Colliery Co. for co-operation, according to a report.

S.M.R. TO FORM TWO IRON AND STEEL PLANTS.—Among the aggressive plan of unifying the pig iron and steel industry under the management of the S.M.R. with capital of Yen 100,000,000 (which is regarded as most conspicuous of many other proposals for industrial activities), the one most talked about is to establish an iron works at Shin-Gishyu, Chosen, in addition to one already working at Anshan, with capital of about Yen 70,000,000, and the other is the proposal of establishing a sister iron works of the one at Anshan in Japan Proper, in close alliance with the Asano and Matsukata interests. President Yamamoto of the S.M.R. is determined to realize both of these plans within several months.

Vice-Admiral Takuo Godo who was entrusted with the purchase of necessary machinery for the pig iron and steel works from the Krupps in Germany returned to Anshan on May 13 with machinery worth Yen 5,000,000. He and President Yamamoto are expected to promote the plan of the unification of the iron and steel industry.

If the S.M.R. is to undertake, as proposed, other industrial enterprises including extensive manufactures of soda and sulphate of ammonia and others, the S.M.R. will need at least new funds amounting to Yen 350,000,000 until the whole scheme is completed, and the question of increasing the capital of the S.M.R. is expected to come up within a year or two.

Mr. Matsuoka, Vice-President of the S.M.R. called on Premier Tanaka in Tokyo and obtained the Premier's agreement in regard to the replacing of the Board of Directors by a Board of Consulting Members. Arrangements have been made that when the S.M.R. files a formal application for permission, it will be readily granted.

BAN PLACED ON YELLOW PHOSPHOROUS MATCHES.—The manufacture of yellow phosphorus matches being detrimental to the health of workers in match factories, its prohibitation is to be strictly enforced by the Ministry of Industry, Commerce and Labor, according to a decision of the Executive Yuan to-day. An order prohibiting the manufacture of such matches was issued in 1926 by the former Government at Peiping, but has been allowed to lapse hitherto. The measure was originally adopted at an International Conference, and China, among other countries, formally subscribed to the agreement in 1923. That in accordance with a communication from the Ministry of Industry, Commerce and Labor, transmitting an official communication from the Hunan Provincial Government, the use of phosphorous, which is detrimental to the health of workmen employed in match factories—having been repeatedly prohibited by international conventions, to which the Chinese Government declared its formal adherence in 1923, and which the defunct Peking Government also prohibited by mandate in 1925—be again prohibited and suppressed within a specified time, by re-issuing the formal mandate, inasmuch as its use in industries seriously concerns the international relations of China and endangers the health of the workers. As regards matches made of phosphorous sulphide, which is not poisonous in its properties and the use of which other governments have not prohibited, the question as to whether it should be prohibited be decided later when appropriate measures have been studied and determined.

TELEPHONE, TELEGRAPH AND RADIO

AUTOMATIC TELEPHONES IN SINGAPORE.—Speaking at the thirty-fifth ordinary general meeting of the Oriental Telephone and Electric Co., Ltd., the Chairman said the work of installing the new automatic exchange equipment at Singapore is well in hand. The buildings have been completed and the first instalments of the apparatus have arrived.

So that, unless any unforeseen contingencies arise, the new exchange should be in full working order shortly after the close of this year, and Singapore will then be in possession of the latest and most modern type of public telephone exchange.

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路拾六號

遠東時報

T. V. SOONG'S FINANCIAL POLICY

By George E. Sokolsky

AMERICAN INVESTMENTS IN THE FAR EAST

CHINA AND THE AMERICAN BANKING GROUP

PORT DEVELOPMENT OF NANKING

DOLLAR RADIO CONTRACT

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distribution of food, a metallic container has advantages—and no entirely satisfactory substitute for tin has yet been found. The demand for tin increases faster than geologists and engineers bring in new supplies; they, and the research workers who are trying to develop substitutes, are in a race against the exhaustion of known deposits.

The region's second significant feature is the presence of the only large oil fields known to exist in the very heart of the densely populated Far East. To the extent that western modes of living come to be more generally adopted, these oil fields will prove increasingly valuable. To a less degree the coal fields of Sumatra, midway between those of New South Wales, India and China, also occupy a strategic advantage. Perhaps in the long run they may prove even more important than the petroleum fields, since the handicap of low quality will probably be overcome as technology is improved, and on the score of quantity there is every reason to believe that the coal outranks the oil. When the latter becomes scarce the coal will still be abundant.

But the big resource, the one that in the long run is likely to prove most important of all, is the iron ore. In present conditions it is under heavy handicaps, but such a great body of the world's most significant metal, even though it is of low grade, seems certain to be requisitioned in course of time. How rapidly this will happen, with all the resultant changes in the industrial life of Malaya, depends on many world factors quite separate from the mere presence or absence of minerals in this particular region.

The Boxer Indemnity and Railways

By H. Stringer

WITH the astute Ministers of the Nationalist Government, having the ear of Foreign Ministers of most European nations, there would seem to be now some chance of the Boxer Indemnity Funds providing the Chinese nation with education, industry and capital through railway expansion.

The Commission sent out in 1926 to decide on the allocation of the British portion of this Indemnity decided for education. This decision was largely influenced by the apparent tendency of the railways to become centres of disturbance. Against this argument it may be said that the railways have concentrated disturbance and devastation and made for a fight to finish. The railways quicken exhaustion in the combatants, for he who holds them keeps the arteries of life, his opponents became a minor disease of which time is the simple cure. Without railways the task of pacification of the whole country would have been impossible, and China would have drifted into another Taiping Rebellion of fourteen or more years' duration, whereas the only plague spots of unrest are now the inaccessible districts of Szechuen, Shansi and Kansu.

China may be at the dawn of a period of some years of quietude, and if she is, there is no national asset so innately healthy as the railways. Within a week of the termination of military control in 1924, the Peking-Mukden Railway receipts went up to $2,000,000 a month; and this average was maintained and even exceeded later. The release of the Shanghai-Nanking Railway to civil control after the late hostilities was followed by an almost immediate return to a paying basis.

To anyone familiar with the conditions of a district before it was tapped by a railway, the ultimate benefit of railways must be unquestioned. Take, for instance, the northern portion of Anhui Province before the Tsin-Pu Railway traversed it. This district had been devastated repeatedly during the Taiping Rebellion. It had never recovered, cities were ruinous and empty, inns were miserable, roads worse, and brigandage rife. Further, in a stretch of some 150 miles the following currencies were in use. The paper dollar of Nanking and the Mexican dollar held good for 30 miles, a Portuguese silver dollar of 1793 replaced this for the next 70 miles, 1,000-cash notes and copper coinage ran for a further 30 miles and, beyond this, the ancient strings of cash. Further standards of length and capacity varied from village to village, and for the average villager the stinking medley of lanes which made a market town was the hub of the universe, the Mecca of immeasurable delights. The crowds which looked to gaze at railway surveyors were an offence to eye and nose, parchment-pale with undernourishment, racked with tubercular coughs, afflicted with a Job's collection of sores. The physical decadence of isolation was only too apparent in the prevalence of harelip, general deformities, and a grade of mentality bordering on idiocy. The people were picturesque at a distance, because their patched garments had the mellowness of great age. They blended well with the anaemic colouring of their sparse crops, the produce of starved land for centuries unrested and overworked.

Flood overwhelmed the northern portion of this district in the summer of 1911. The villages became mere heaps of stinking slime, damp islands in the slurry of the fields where rotten crops lay bleaching. Draught animals were drowned in heaps, the seed-corn spoilt, the land too soured by inundation to get an autumn crop. Famine gripped some hundreds of square miles in the late autumn. There had always been a hair's breadth between staving the pangs of hunger and starvation. Grass and the bark of trees became the food of most, beancake the staple diet of the lucky few with money enough to buy it. Typhus followed as a natural consequence, and death was ever present, in work, in walks, about one's house. Thousands died, and as many more were saved solely because the new unfinished railway was able to provide a limited amount of transport to the Red Cross. If morbidly inclined, imagine the famine of 1922 in Shantung without rail connection to Manchuria and recollect that 8 millions died in Chihli, Shantung and Shansi in 1887 for lack of transport and no roads worthy of the name.

On humanitarium grounds the case for railways is unquestionably strong. It is equally so on the economic score. Within a year of the establishment of through rail-connection on the railway in question, currency difficulties had disappeared. The line became an artery of trade. Most people have heard of Pengpu to-day, a flourishing town, in 1908 a string of hovels on a muddy lane—kennels for some 200 starvelings. Nanhsuchow and Hsuchowfu in pre-railway days were known only to students of the postal directory as dependent on couriers for letters, and for telegrams, on a telegraph-line generally deeply engaged in the promulgation of a five-column edict from Peking. To-day they have electric light. Paved roads edged with solid houses link the city and the station, a brown scar in green fields when first the railway came. Remember also that these railway towns have doctors and hospitals of various grades. Relief of some sort is now within the reach of many who once were doomed by ignorance and isolation.

So much for the tendencies of railway expansion. Consider now the tendencies of Western education in China. Here we have a longer period for observation than in the case of railways. The first educational mission was that of Yung Wing, which left China for the United States in 1875. Very many of its members became prominent men of affairs, but they had to wait for many years before coming into their own. The Empress Dowager would have none of the New Learning; the Emperor's madness of 1898 had come too near success. Root and branch the Empress did her best to kill a poisonous growth, as she conceived it, and she was well served. The Yamens took their lead. Oh yes! the old style examinations were abolished in 1904, but it was not until 1906 that official examinations were renewed on modern lines, and then no successful candidates found employment. A few of the foreign-educated found positions with the far-sighted officials who recognized the futility and danger of the policy of exclusion. Li Hung-chang gave limited opportunities. Tang Shao-yi was a protégé of Yuan Shih-kai. Jeme Tien-yu, China's foremost engineer, came to the front under Yuan.

But these were the men not to be denied. The small fry who got a half-education in Japan were ignored, and formed the nucleus of the "China for the Chinese" and "Sovereign Rights" party, which created the pother over the Shanghai-Hangchow Railway loan in 1908. Then came the millenium of 1911, and the student had his chance at last. He failed, he merely talked and squeezed, whereas the old official squeezed, but now and then did something astonishingly tangible and wise. The student was the proverbial unproductive crystal egg.

Then the soldier took a hand in government and discovered his power after Yuan Shih-kai's death in 1916. The semi-educated malcontent has been on the increase ever since 1914, when the War set back the dawning era of industrial expansion. Such expansion really hinged on railways, and railway-construction ceased then. The number of students increased every year, but capacity to employ these men did not increase with the largest industrial undertaking in the country merely marking time.

America had also largely increased facilities for foreign education by allocation of a portion of her Boxer Indemnity to this purpose in 1908. The railways, telegraphs and other government undertakings have done their best to absorb these with a claim on the government, but these departments are so overstaffed that there is little for the men to do outside a dull routine. There is no chance of rapid promotion, and no chance of acquiring experience as there is no money for expansion. Thus even government henchmen drift into teashop treason and minor plottings. For the ordinary-student the creation of disturbance has become a profession, unless he has had the good sense to soil his hands with trade. There is no scope for education without employment, and the undertaking which gives greatest employment for the educated men for least capital is unquestionably railways. To give further facilities for education without expenditure on the provision of employment is merely adding to the present discontents and also adding to a permanently restless, unemployable, and very dangerous class, simply because they have the ear of the simplest and most gullible mob in the world.

The case for medical education is not a strong one. Doctors and hospitals are undoubtedly needed. But medical education, as Kipling's Lama remarked of all learning, "is of no earthly use unless of best sorts." The course is expensive in any case, and in China it is complicated by having to learn in a foreign language in most institutions.

A lengthy course is distasteful to the Chinese mind. The Chinaman always expects a quick return for his money. The student of medicine is, as often as not, content to leave the university unqualified, but with that dangerous half-knowledge which suffices for the modern doctor in the remoter cities.

What is true of medicine applies to other professions. The Chinese student has yet to find out that there is no royal road to sound learning. Mental indigestion is the chronic disease of Yong China of to-day. Mental exercise on practical problems, not Marxian or Anarchist theories, is the cure for this ailment, and, until this can be provided, the use of the Boxer Indemnity for education can surely only be attractive to those with a belief in "Cast thy bread upon the waters and it shall return after many days."

That there is some case for the use of this money for railways will, perhaps, be conceded. The question of the best way of using the money needs a little consideration.

The British share of the Boxer Indemnity was in 1920 £11,180,000, or say 100 million dollars. This money, at $90,000 per mile, would build, say 1,250 miles of railway (equipped with a 60-lb. rail) in easy country, or, taking the cost of the Lung-Hai Railway (which has been constructed spasmodically but with comparatively little obstruction), at a cost of $12,000 per mile, say 830 miles.

Of this expenditure at least 30 per cent, or say $40,000 per mile, is for imported material, which is, presumably, in this case, to be of British origin.

This would total for the whole of the 830 miles, a sum of $33,200,000, or £3,465,710 at the present rate of exchange.

The net revenue which would accrue to an extremely needy Government totals $9,150 per mile per annum, or a total of $7,600,000 annually for the 830 miles. This is on the basis of the Government Returns of 1922; it is the average for the whole of the railways for a year of war and disturbance.

An efficiently managed railway in China will pay its operating expenses in a couple of years, and the line could not fail to be on a paying basis in three to four years at the outside, if the money was wisely spent on suitable projects.

In this last connection it is as well to mention that there are quite a number of abandoned railway projects in the country at the present time, on which there has been considerable expenditure.

The estimated amount of this is as in the table below :—

	Approximate Expenditure
Hankow-Szechuen	£1,000,000
Pukow-Sinyang	207,000
Nanking-Hunan	200,000
Ching-Yu Railway	1,085,000
Pin Hui	100,000
Peking-Suiyang	800,000
	£3,392,000

To these may be added the Canton-Hankow Railway, the enormous expenditure on which must remain of limited usefulness until through connection to Canton is made.

There should undoubtedly be an effort to make these derelict investments productive.

It would, however, be infinitely better to keep this money permanently under a Sino-British Board of control and allocate the yearly income as required, either for urgent railway expansion or for renewal of rolling stock, etc. Income at 6 per cent. from 100 million dollars is $6,000,000 annually, which would suffice to build at the rate of say 100 miles a year. Thus gradually the mileage under what we will call the Boxer Indemnity Board would increase, and China would have at last, to a limited extent certainly, a yearly construction programme which would ensure a greater rate of expansion than has obtained since the War. Thus also would be created a permanent construction staff of engineers, men who would have no chance of rusting under the influence of years of maintenance routine.

There is no reason why such a Board would not work well. It has succeeded admirably in the case of the International Famine Relief Association. Members of the Board would be selected from officials of the Government Railways.

The money available for extension would also increase yearly, as it would, of course, be a *sine qua non* that all surplus revenues from Boxer-built lines would be allocated to new construction.

Dirigible Air Service for the Pacific

THE linking of the United States with China and Japan within three years by the establishment of a dirigible air mail and passenger service across the Pacific, is now well within the realms of possibility. The establishment of such a service is receiving particular attention by a group headed by Paul W. Litchfield, president of the Goodrich-Zeppelin Company of Akron, Ohio, and composed of such leaders in commercial aviation as C. M. Keyes and his financial associates. The Dollar steamship interests are also reported to be negotiating with the Goodyear-Zeppelin Company looking towards the establishment of such a service.

The contemplated air service calls for the construction of two super-dirigibles of 6,500,000 cubic feet capacity each, with accommodations for 60 to 100 passengers and cargo space for from 10,000 to 20,000 pounds of mail, express and baggage. The cost of establishing the service would be, according to its promoters,

South Manchuria Railway

[From the "Report on Progress in Manchuria 1907-1928," published by the South Manchuria Railway]

THE South Manchuria Railway is more than a railway company. In addition to the extensive railway undertakings in South Manchuria which constitute the main business, it conducts, as accessory enterprises, coal mines, iron works, wharves, warehousing, etc. The Company also conducts educational hygienic and other public works within the Railway Zone; controls a number of joint-stock companies, electric and gas works, shipping and dockyard companies, hotel undertakings, etc., chiefly in South Manchuria, and acts also as a holding company for these concerns. The functions of the corporation and the volume of its business are possibly the largest of their kind in the Orient, and in some respects, are unsurpassed by any other concern in the Pacific area. The story of its development is also, to a great extent, the story of the progress of Manchuria in the last twenty-one years, for both are inseparably related.

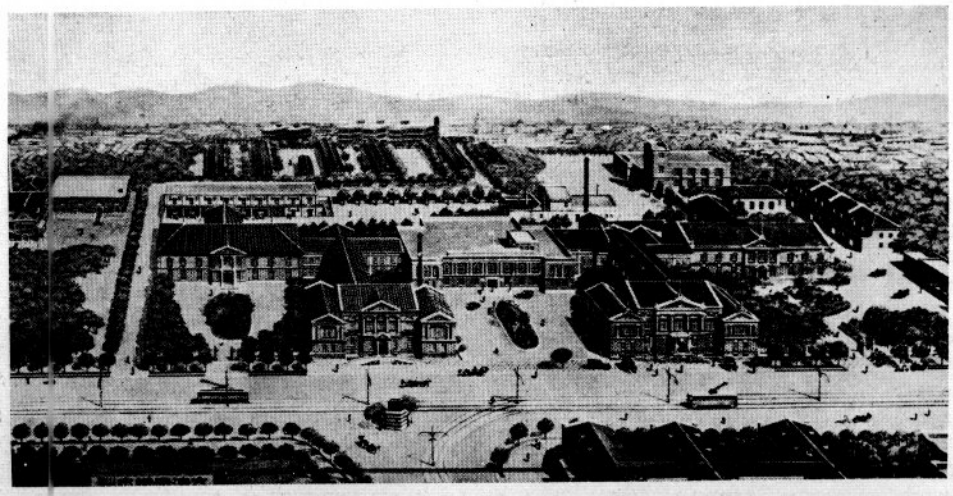
Formation of the Corporation

The Japanese Government engaged in most serious considerations prior to the establishment of the Company. In contrast to the political or military line first built by the Russians in Manchuria, it was decided that the railways to be conducted by Japan should rather be commercial in order to serve international trade and facilitate the development of industry and agriculture in Manchuria. Whether the railway should be conducted directly by the Government, as in Japan proper, or by a joint-stock corporation was another question. The capital of the undertaking had to be adequate, otherwise efficiency of operation and international service might not be obtained. Above all, the most important consideration was that the principal business of the Company was to be operated and conducted in a foreign land.

As stated in a previous chapter, when the *post-bellum* program was submitted to the Council of Cabinet Ministers and Elder Statesmen in May, 1906, it was held that the Japanese policy adopted in Manchuria should respect China's sovereignty and should adhere to the principle of equal opportunity for all nations.

The Imperial Ordinance sanctioning the organization of the South Manchuria Railway Company was promulgated on June 7, 1906. The ordinance provided (1) that a joint stock corporation, called the Minami Manshu Tetsudo Kabushiki Kaisha (South Manchuria Railway Joint Stock Company) should be organized for the purpose of engaging in railway traffic in Manchuria; (2) that the shares of the Company should be registered and owned only by the Japanese and Chinese Governments or by their nationals; (3) that the Japanese Government may offer as a part of the capital its Manchuria railways, coal mines and appurtenances obtained in 1905 from Russia by the Treaty of Portsmouth and approved by China in virtue of the Peking Treaty concluded in the same year; (4) that the President and Vice-President should be appointed by the Government, and the directors appointed from among the shareholders, but that the directors should be elected at the General Meeting of the shareholders; (5) that to matters relating to the Company not provided for by this ordinance the provisions of commercial law should be applied. On the 13th of July, the organization committee of eighty persons, including higher officials in several Government departments, leading members of the Diet, University professors, and eminent businessmen of the Empire, was organized. General Kodama, who served as Chief of the General Staff to Field Marshal Oyama in the war with Russia, was appointed chairman, and on his death Viscount Terauchi, who was War Minister at the time, succeeded him. On August 1st, an order setting forth the conditions of the formation of the Company was given to the committee by the Ministers of Foreign Affairs, Communications, and Finance conjointly.

These conditions provided, (1) that the railway tracks should be changed to 4 feet 8½ inches (standard) gauge within three years from the day when the Company should commence operations; (2) that on the Dairen-Changchun trunk line, the tracks between Dairen and Suchiatun (near Mukden) should be doubled; (3) that the necessary arrangements for connecting land and sea where harbors or bays were approached by the railways should be provided; (4) that business functions be provided, mainly in connection with railway enterprises and accessory undertakings—coal-mine operation, water transportation, warehousing, electric enterprises, etc.; (5) that furthermore the Company should carry out public works, education and sanitation in the Railway Zone with Government permission; (6) that a Government guarantee would be provided for the payment of interest on debentures and for the repayment of principal. It was also provided that when the dividend of the Company for any business year should be less than 6 per cent. on the paid-up capital, the Government should make up the deficiency for the period of fifteen years. Acting on the above-described Imperial Ordinance and Government order, the committee finally, on the 14th of August, drew up the articles of incorporation of the South Manchuria Railway Joint Stock Company, observing in many respects the provisions of the commercial law of Japan, and the articles of incorporation of the Company obtained the Government's approval on the 18th. When the general meeting of shareholders for the establishment of the Company was held on November 22nd, the articles of incorporation were unanimously passed. Thus the South Manchuria Railway Company came into existence by a special charter of the Government, but essentially as a joint-stock company organized in conformity with the provisions of the commercial law of Japan. When Baron Goto (now Count) was recommended at the general meeting as the President of the newly-established corporation, the President spoke on the mission of the South Manchuria Railway. He declared that though the total length of the railways to be operated by the Company was a little less than 700 miles, their position constituted a link in world communication and provided international business facilities, not only for the Orient but also for the world at large. The policy of the Company should be in conformity with the will of the Government and the shareholders, but should give the greater weight to the general wishes of business men at home and abroad. More particularly should a spirit of co-operation with the Chinese authorities and people be cultivated.



A Bird's-eye View of the Head Offices of the South Manchuria Railway Company, Dairen

Organization

Most serious attention was paid to the selection of the

personnel of the governing board of the Company. Baron Goto, who had exhibited organizing and executive ability in civil administration and industrial undertakings in Formosa, having been appointed President, the directors of the Board were selected from among persons having ability and experience in banking, trading and railway operation, in the legal profession, and in civil administration. Baron Goto's service, though it was of short duration, being rather less than two years, placed the Company on a sound basis. The terms of office of the President and Vice-President were fixed at five years, and of Directors at four years ; but it is a matter of regret that political changes in Japan have often compelled a change in the presidency of the Company, so that nine Presidents have functioned during the last 21 years. Yet during these years the Company has made great progress. Its investments have grown to Y.644,800,000 from Y.101,800,000, and its annual profit to Y.36,274,000 from Y.2,017,000.

The present President, Mr. Jotaro Yamamoto, and the Vice-President, Mr. Yosuke Matsuoka, were appointed on July 19, 1927. Presdient Yamamoto is a business man well known in Japan for high executive ability ; Vice-President Matsuoka spent many years in the diplomatic service, and joined the Company as Managing Director in 1921, serving in this office until 1926.

It is the policy of the new President to place the Company's business on a more sound economic basis, and to take progressive steps to develop enterprises which will afford benefit to Japan and equally to China. In a speech made at the shareholders' general meeting held on June 20, 1928, he stated that Manchuria and Mongolia contain a vast territory still to be opened up, where many natural resources await a market. The extraordinary migration of Chinese to Manchuria and Mongolia, annually numbering over one million people, is one of the important factors entering into the development of these regions. In the economic relation of Japan with Manchuria, Japan's primary consideration lies in receiving from Manchuria foodstuffs and industrial materials, while fostering the export of Japanese manufactures to China, which is a great customer for Japanese goods. The South Manchuria Railway, he declared, is naturally charged with the mission to carry out this national policy and to function as an instrument for its execution. As the first step, it was decided that the Fushun shale oil industry project, which had been pending for several years, should be carried into effect so as to ensure the production of 55,000 tons of heavy oil a year. By installing one more blast furnace, with a capacity of 500 tons, at the Anshan Iron Works, its annual output is to be increased to 200,000 tons from 150,000 tons. Following the policy of placing the Company's business on a more sound economic basis, by readjusting the extensive organization and by eliminating supernumeraries, expenses were cut down, while equipment and efficiency were improved. The result was that the Company's net profit for the fiscal year ending March 31, 1928, increased to Y.36,270,000, *i.e.*, an increase of Y.2,120,000 over that of the preceding fiscal year.

Count TERAUCHI, Succeeded as Chairman after Death of Count Kodama

Count KODAMA, Chairman of the Organizing Committee of the S. M. R.

Count GOTO, First President of the S. M. R.

Mr. YOSUKE MATSUOKA, Present Vice-President of the S. M. R.

Mr. JOTARO YAMAMOTO, Present President of the S. M. R.

When the Company commenced operations in April, 1907, its organization was divided into five departments ; General Affairs, Research, Transportation, Mining, and Local Affairs. The directors, though constituting the board of administration, had also to act as departmental chiefs, but in the course of years the administration underwent various changes, until in April, 1923, the organization as it at present exists was evolved. In addition to the President's Secretariat, there are five departments, General Affairs, Railways, Industries, Local Affairs, and Treasury. Affiliated offices are the Tokyo Branch Office, Fushun Coal Mining Office, Anshan Iron Mining Office, Technical Committee, etc. As the functions and volume of business are steadily increasing, the directors have ceased to perform the duties of departmental chiefs, but attend jointly to the supervision of important business under the control of the President, besides acting as a board of directors, leaving departmental business to the general managers who act as department chiefs.

At the close of the fiscal year ending March 31, 1908, the Company employed 2,967 officials, and 6,135 Japanese and 4,129 Chinese workers, totaling 13,231. After twenty-one years, *i.e.*, on March 31, 1928, the official staff had increased to 8,832, the Japanese workers to 11,865, and the Chinese to 13,677, totaling 34,374. In addition, the coolie day laborers who are nearly all Chinese, increased from 30,000 enrolled per day to 70,000.

Finance and Accounting

The authorized capital of the Company was originally Y.200,000,000, of which Y.100,000,000 was furnished by the Japanese Government turning over all its property in railways and coal mines and their appurtenances to the Company. The other half was offered for subscription to the Chinese Government and the Japanese and Chinese public, but this offer was not accepted on the

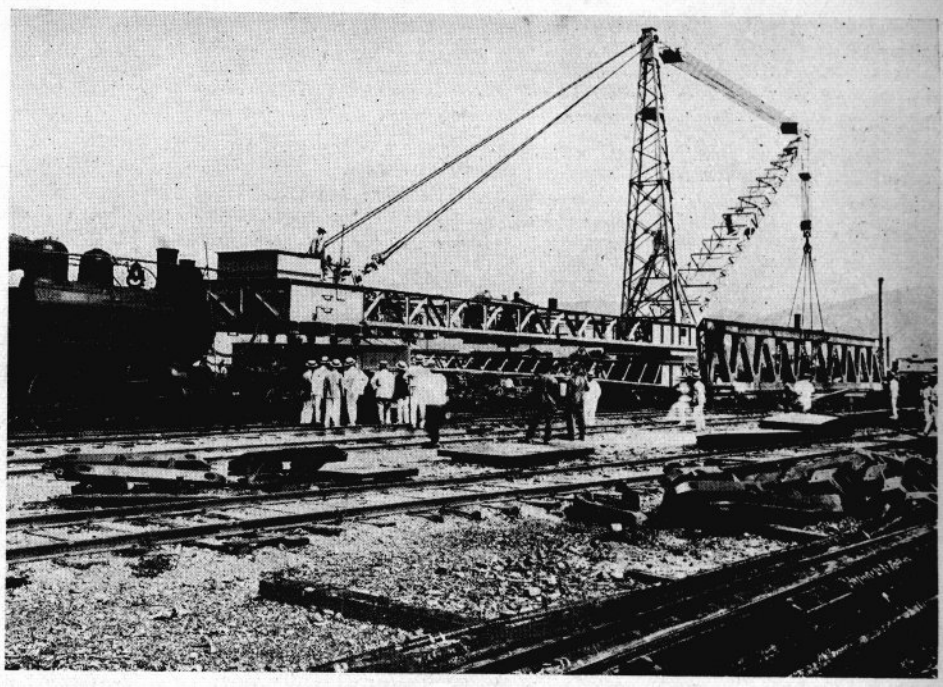
part of the Chinese. When the first issue of shares was floated in September, 1906, the Japanese general public over-subscribed the issue no less than 1,066 times. Up to March, 1920, Y.80,000,000 was paid up, leaving Y.20,000,000 uncalled, but with the necessary development of the Company's activities, especially after the Great War, the Company increased its capitalization from Y.200,000,000 to Y.440,000,000. The Government again increased its holdings, by Y.120,000,000, or half of the increased capital, by taking over three debenture issues which the Company had floated on the London Market: £4,000,000 of five per cent., £2,000,000 of five per cent., and £6,000,000 of four and one-half per cent., totaling £12,000,000. The actual net receipts were £12,000,000, being Y.117,156,000 in Japanese currency, while of the Government holding Y.2,844,000 was left unpaid. Of the remaining shares, amounting to Y.220,000,000 allotted to the general public, Y.138,000,000 have been subscribed, and Y.82,000,000 remain uncalled, as on March 31, 1928.

The Company was originally authorized to issue debentures to the amount of the unpaid share capital belonging to other than Government holders. By Imperial Ordinance No. 4 of 1910, this amount could be expanded to twice the amount of all paid-up share capital, but could not exceed the amount of the authorized capital. The Government may guarantee the payment of interest and principal of the debentures to the same extent, if necessary, but debentures issued with the Government guarantee must be redeemed within twenty-five years.

The financial policy of the Company in the first stage was to raise funds for its undertakings more by issuing debentures than by floating new capital shares. Finding the most favorable market in London, four issues of debentures, aggregating £14,000,000, were floated there in succession during the four years ending January 3, 1911. Of these debentures, £12,000,000 were, as previously stated, taken over by the Government in payment for its holdings of share capital, and the remaining £2,000,000 were redeemed on July 1, 1911. Since then, more than twenty-two issues of debentures were made in Japan up to May 31, 1928, except one amounting to £4,000,000 which was issued on the London market on July 19, 1923. Nine out of these twenty-two issues had been redeemed up to the end of the business year on March 31, 1928, leaving fourteen issues outstanding, aggregating Y.278,152,000.

The Company started its undertakings in 1907 with an estimated fund of Y.100,000,000, of which Y.80,000,000 was raised by floating bonds in England and Y.20,000,000 by calls on shares.

The fund thus raised by the means mentioned above have been invested in various enterprises. During the last twenty-one years, ending March 31, 1928, the investment in direct undertakings, including the appraised value of properties taken over by the Company from the Japanese Government in 1906, aggregated Y.644,841,734, as shown by the table below:



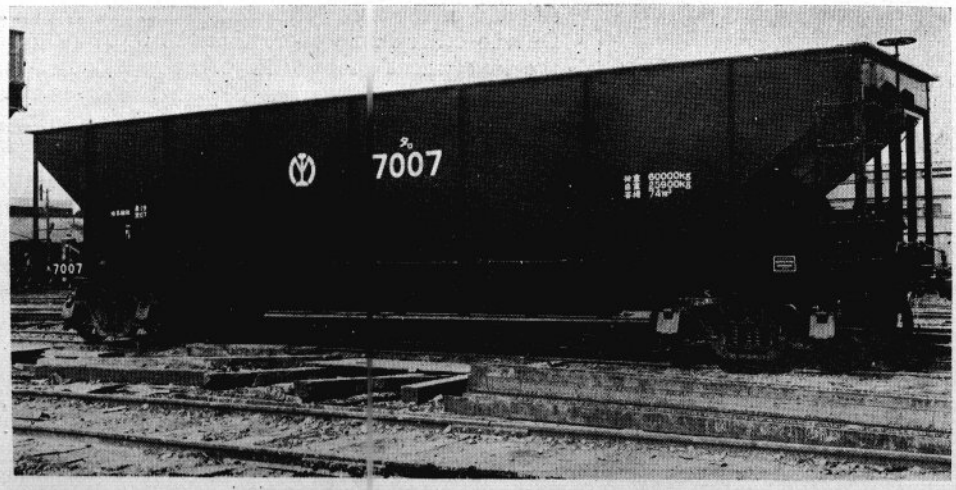
45-ton Capacity Special Steam Crane for Railway Bridge Girder Work for South Manchuria Railway

	1907-8	1912-3	1917-8	1922-3	1927-8
Railways ...	34,542,910	97,113,296	105,530,752	189,616,304	239,517,926
Workshops ...	763,906	6,048,094	7,569,359	11,068,325	8,759,631
Steamships ...	—	3,385,357	2,680,317	3,559,874	4,044,933
Harbors ...	6,640,837	14,779,320	24,099,384	37,064,308	59,789,109
Coal Mines ...	46,396,043	56,469,164	71,097,985	121,056,784	102,730,711
Iron Works ...	—	—	4,447,760	34,541,803	20,747,607
Electricity ...	474,695	5,002,052	5,738,182	15,237,405	—
Gas	3,592	1,170,495	1,554,778	5,434,140	—
Hotels ...	216,302	1,342,106	2,075,006	2,370,222	—
Public Works	3,374,494	11,022,573	17,786,171	40,863,288	164,679,343
Others ...	9,459,178	18,544,224	21,782,973	46,074,005	44,572,475
Total ...	101,871,957	214,876,681	264,362,667	506,886,458	644,841,735

The growth of these enterprises is shown by the following table of receipts, expenditures, and net profits:

Fiscal year	Receipts	Expenditures	Profits	Percentage of expenditure against receipts
1907-8...	Y.12,543,116	Y.10,526,531	Y.2,016,585	84
1912-3...	33,546,477	28,620,433	4,926,045	85
1917-8...	69,429,252	54,503,610	14,925,643	79
1922-3...	169,956,646	134,876,402	35,080,244	79
1927-8...	230,558,523	194,284,201	36,274,323	84

The net profit of the Company for the year 1907 was Y.2,000,000; it had increased to Y.36,000,000 twenty-one years later. The railways furnish the most important item of profit, the total amounting to Y.68,000,000 to-day, surpassing by far the net profit of the Company. Next to the railways, the coal mines yield about Y.9,700,000 profit, and harbor undertakings about Y.970,000. Other enterprises of the Company to date are conducted at a loss, or a nominal profit, but are designed for the public benefit and to develop traffic for the railway. The expenditures for local public works such as schools, hospitals, street and road-building, industrial and agricultural model farms, etc., were more than Y.19,000,000, and the receipts less than Y.6,000,000. The hotel undertakings were losing more than Y.264,000 a year, and Anshan Iron Works Y.157,000 a year. The following table shows the profit and loss account of the Company for the fiscal year ending March 31, 1928.



60-ton Capacity All Steel Coal Cars for South Manchuria Railway

	Receipts	Expenditures	Profit and Loss
Railways	113,244,180.15	45,235,834.93	68,008,345.22
Harbors	10,275,942.58	9,305,782.43	970,170.15
Coal Mines	82,787,419.09	73,039,118.77	9,748,300.32
Iron Works...	9,223,114.00	9,380,656.31	— 157,542.31
Hotels	1,000,859.52	1,264,943.69	— 264,084.17
Local Public Works ...	6,098,233.67	19,104,444.35	—13,006,210.68
Interest on Deposits and Loans	5,445,735.56	20,567,502.88	—15,121,767.32
Sundry Profit and Loss ...	2,483,039.34	2,839,438.77	— 356,399.43
Overhead Charges ...	—	11,482,935.73	—11,482,935.73
Depreciation Fund for Debentures	—	2,063,542.97	— 2,063,542.97
Total	230,558,523.91	194,284,200.83	36,274,323.08

In the matter of dividends on the net profit of the Company, the Japanese Government guaranteed payment up to 6 per cent. on the publicly held shares, if the dividend should fall below that percentage ; but the Company's enterprises, especially the railways, were so successful that a 6 per cent. dividend on the publicly held shares was paid from the first fiscal year, and was gradually increased to 10 per cent. The Government shares in the profit, but only after payment has been made of all charges and of the 6 per cent. dividend on the public shares. The Government received such dividends from the fiscal year 1909, and has received 4.3 per cent. on its holding since 1921.

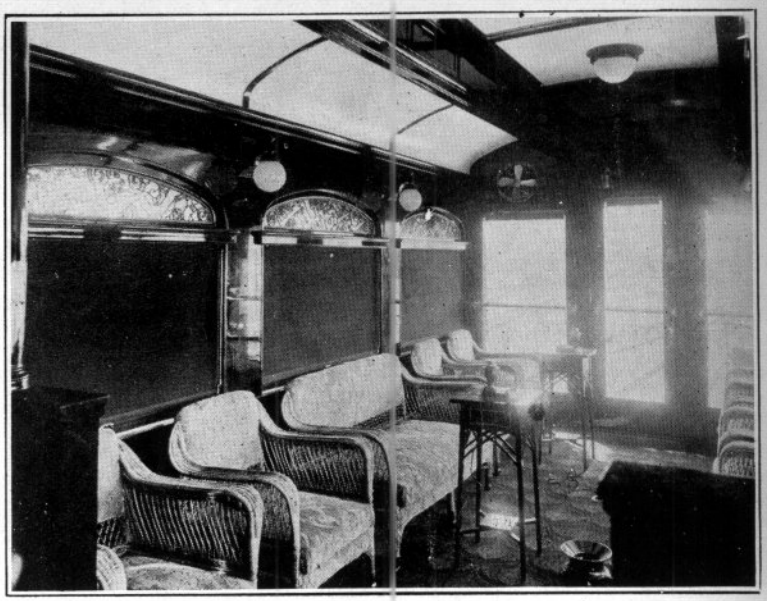
Appended is the General Balance Sheet—Assets and Liabilities at the end of the Fiscal Year, March 31, 1928, and the disposal of Profits.

ASSETS.

Capital Stock uncalled	Y.84,844,000.00
Fixed Investment	644,841,734.32
Merchandise	4,787,214.55
Stores and Supplies	7,450,956.25
Bonds and Shares	55,287,181.24
Cash on Hand	240,204.72
Deposits	40,490,222.96
Loans	59,452,855.32
Securities Received in Pledge	5,577,794.52
Due from other Concerns	997,409.82
Guarantee Fund	894,932.20
Bills receivable	5,798,421.51
Miscellaneous Accounts receivable	56,848,639.66
Miscellaneous Accounts paid in advance	13,728,372.07
Unadjusted Balance in Engineering and Workshop Accounts	728,969.27
Discounts on Bonds and Charges	12,970,972.68
Exchange Accounts	9,095.99
Total Assets	994,948,976.08

LIABILITIES.

Capital Stock authorized	Y.440,000,000.00
Legal Reserve	17,463,903.38
Special Reserve	127,400,000.00
Bills payable	3,700,000.00
Retirement Allowance Fund for Employees... ...	2,500,000.00



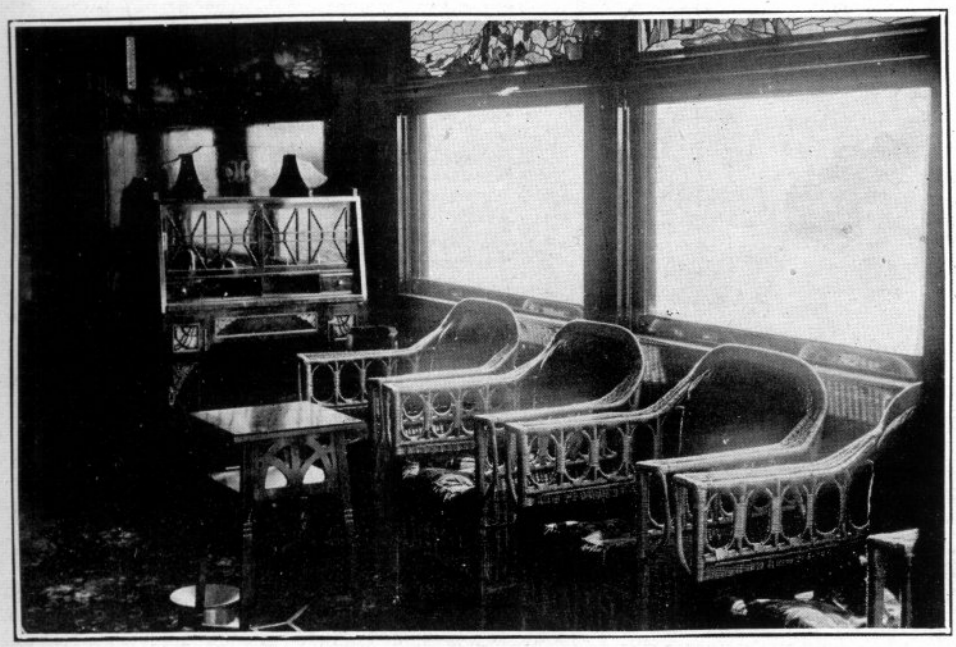
Interior of Observation Car for the S.M.R. Built at the Shakako Works

LIABILITIES.

Debentures	Y.278,152,000.00
Due to other Concerns	1,217,131.28
Securities given in Pledge	882,000.00
Guarantee Fund	3,210,429.01
Exchange Accounts	53,279.82
Savings Deposits of Employees	7,771,566.99
Guarantee Deposits of Employees	27,507,530.61
Mutual Relief Society Fund	4,331,057.51
Miscellaneous Accounts payable	23,371,630.93
Matured Bonds unpaid	769,700.00
Miscellaneous Accounts received in advance ...	11,548,586.44
Balance brought from previous Term	8,795,837.03
Net Profit	36,274,323.08
Total Liabilities	994,948,976.08
Net profit for the Year ended March 31, 1928 ...	36,274,323.08
Balance brought from previous Term	8,795,837.03
Total	45,070,160.11

DISPOSAL OF PROFITS.

Legal Reserve	Y.2,836,096.62
Dividends on Government Stock	9,337,708.00
Dividends to Shareholders other than Government (6% per annum)	7,740,000.00
Supplementary Dividends to Shareholders (4% per annum)	5,160,000.00
Special Reserve	8,000,000.00
Retirement Allowance Fund for Employees... ...	2,000,000.00
Bonuses to Officials	500,000.00
Balance carried forward ...	9,496,355.49
Total	45,070,160.11



An Observation Car is Part of the Equipment on S.M.R. Express Trains

For the past twenty-one years, the special reserve and the legal reserve were gradually increased, and aggregated about Y.150,000,000 at the end of the fiscal year closing March 31, 1928. On the other hand, more than Y.100,000,000 in the investment account have been written off in the same period in respect of depreciation of the Company's properties. It will thus be seen that the financial standing of the Company is on a sound basis.

Railways

The South Manchuria Railway Company to-day owns and operates railway lines totaling 690.8 miles, in which the sum of Y.239,517,926 was invested up to the end of the fiscal year ending March 31, 1928. The gross revenue for the year was Y.113,244,180 expenditure Y.45,235,835, and profits Y.68,008,345, or Y.98,449 per mile. These figures reveal the fact that in efficiency and earning capacity the S.M.R. probably surpasses the leading railways in America, Europe, or Japan.

Engineering Notes

ELECTRIC LIGHT, POWER AND TRACTION

NOSEI DENRYOKU K.K.—(Nosei Electric Power Co., Ltd.) The Kimbara Power plant of this company has just been completed. Operation is not yet started, as the power contract with Miye Godo Denki K.K. (Miye Consolidated Electric Co., Ltd.) is still pending. The capacity of this station is rated at 4,400 k.w.

CHOSEN DENKI KOGYO K.K. (Korea Electric Industrial Co., Ltd.) This company has recently decided to extend the equipment of the Senkyori Steam Power Station. The present capacity of 6,500 k.w. is to be increased by installing two units of 5,000 k.w. generators. The plan is to provide for shortage of water during the dry season.

This move on the part of this company is looked upon with great interest. Experts anticipate that many steam power plants will be established in Korea in future.

RAILWAYS

MORE LOCOMOTIVES FOR INDIA.—Sir W. G. Armstrong, Whitworth and Co., Ltd. announce that they have secured a further order from the High Commissioner for India for the construction of twelve 4-6-2 Locomotives and Tenders of the new standard X. B. type for the 5-ft. 6-in. broad gauge lines of the Madras and Southern Mahratta Railway.

These locomotives which will be built at the firm's Scotswood Works, Newcastle-upon-Tyne will be shipped in fully erected condition on one of the motor vessels specially designed and constructed by Armstrong, Whitworth for this service.

CHINESE RAILWAY EXPENDITURES.—It is officially announced at the Ministry of Railways to-day that an amount totalling £349,625, from the Belgian Boxer Indemnity Fund, has been spent by the Lunghai Railway for the purchase of cars, locomotives and other railway materials. The amount which has been allotted to the railway from the Belgian Boxer Indemnity Fund was £370,487, thus leaving a balance of approximately £20,862 which amount will probably be used for purchasing rails and other materials for the western section of the railway. The purchases made are as follows:

First-class and second-class cars, dining cars and sleepers	£40,284
Freight cars	4,190
Railway bridges	14,820
Steel Sleepers	30,432
Railway bridges	28,200
Rails	108,620
Water Feeders	4,490
Telephones...	305
Dining car and sleeper equipment ...	2,440
Pipes	650
Miscellaneous materials	12,300
Locomotives	73,000
Miscellaneous materials	15,600
Miscellaneous materials	14,400

—*Reuter.*

CONSTRUCTION OF TAIYUAN-SHIHKIACHWANG RAILWAY EXTENSION TO TSANGCHOW UNDER CONSIDERATION.—Construction of the Taiyuan-Shihkiachwang Railway Extension to Tsangchow in northern Hopei, will shortly be started, consequent to an arrangement between Mr. Sun Fo, Minister of Railways, and Mr. Ho. Ya-lung, Managing-Director of the Taiyuan-Shihkiachwang Railway. Director Ho recently arrived here from the Shansi Provincial Capital to confer with Minister Sun in accordance with instructions from General Yen Hsi-shan. The cost of the proposed construction is estimated at $16,000,000. Measures to secure funds have already been formulated.

WORK ORDERED ON NEW SECTION OF CANTON-HANKOW LINE.—Mr. Sun Fo, Minister of Railways, issued instructions on July 4 to the administration, construction and finance departments of the Ministry to start preparations immediately for the completion of the Shaokwan-Lochan section of the Canton-Hankow Railway. A sum of $2,000,000 will be appropriated from the Belgian Boxer Indemnity Funds for the work.

Since a large amount of the materials which will be used in the construction of the line have to be purchased abroad, the above departments of the Railway Ministry were instructed to make an estimate immediately as to what materials will be needed. It will take some time before these can be delivered, so it is thought that the orders should be put in as early as possible.

AGREEMENT BETWEEN MINISTER OF RAILS AND A BRITISH FIRM.—The following are learned to be the salient points in the loan agreement for material to be supplied to the Shanghai-Nanking Railway, which was concluded between Mr. Sun Fo, Chairman of the Railway Department, and the representative of the Anglo-Chinese Corporation on June 21:

1. Nine locomotives, 24 steel passenger cars, and 100 40-ton steel covered goods cars shall be bought from a British factory, public tenders being received for the same.
2. The amounts of the loan shall be £156,000.
3. Interest is 8% per annum.
4. The loan shall be amortized in 20 months, payment being made every month out of the revenue of the Shanghai-Nanking Railway.
5. The agreement shall become effective when it is sanctioned by the national government.

BELGIAN BOXER FUND FOR ROLLING STOCK.—The Ministry of Railways officially announces to-day that $1,000,000, out of a total of $1,600,000 of the Belgian Boxer Indemnity Fund, will be used for the purchase of new rolling stock for the Tientsin-Pukow Railway. This purchase will include restaurant cars, mail and baggage vans and first and second class coaches. The balance will be used for the purchase of steel goods-wagons to be distributed among the government railways.

Recently, through the Purchasing Commission, the Ministry invited tenders for the supply of ten "Mikado" type locomotives for the Tientsin-Pukow Railway. The selection fell on the Baldwin Locomotive Works, whose agents in China are Messrs. Andersen, Meyer & Co., Ltd. According to the locomotive company, the ten locomotives are being shipped to China by a specially chartered steamer which is due to arrive in China about the end of September. The delivery is to be effected at Tsingtao, where the locomotives can be easily landed and switched on to the Tientsin-Pukow line.

Tenders for 9 locomotives of the "Pacific" type, 100 steel goods-wagons, of 40 tons capacity, and 24 frames for passenger cars are now being invited in London by the British and Chinese Corporation on behalf of the Ministry. The new rolling stock will be for the Shanghai-Nanking and Shanghai-Hangchow lines. The amount involved is approximately £160,000.

INDUSTRIAL

FUJI-NAGATA WILL BUILD TWENTY-FIVE RAILWAY COACHES.—The Fuji-Nagata Shipyard, Osaka, will receive from the railway Department an order for the construction of 25 railway carriages, it has been decided by the authorities, since the revival plan of the firm has taken shape.

OIL FIELDS IN KARAFUTO: Preparations are being made by the Nippon Sekiyu K.K. for prospecting oil fields in South Karafuto, in accordance with the contract recently closed between the Government of Karafuto and the company. The mining office has been established already, and the company is ready to begin operations. According to experts, the oil fields in Karafuto are connected with Niigata and Akita fields, so that it is doubtless that there is a considerable deposit, but it is difficult to ascertain the quantity unless after thorough prospecting. The company must be prepared to repeat failures, for at least two years, before they can succeed, it is reported.

ASAHI SEKIYU K.K. (Asahi Petroleum Co., Ltd.) The Hikoshima Plant of this company is to be completed before the end of August and operation is to be started in September this year. This company sold the Tokuyama Plant to the South Manchuria Railway Co., Ltd., in April, but before delivering the mill the company had manufactured as much as it could, so that it carries stocks enough to last for the summer slack months. In case the stock runs low, the company will begin operation in the uncompleted plant. The productive capacity of this plant is rated at some 2,000 tons a month, of light oil and various kinds of machine oil. Extensions are to be made gradually, to manufacture other kinds of oil as well.

THE LUNGHWA CEMENT FACTORY.—Along the left bank of the Yangtze River and at some distance from the Lunghwa Station, is located the Lunghwa Cement Factory. The area it covers yields neither limestone nor clay. The Factory was founded in 1921, its initial capital being estimated at $2,400,000. The raw materials for manufacturing cement come down mainly from the Yangtze River.

Clay comes from Zushan, Sunkiang; limestone, from Chenwanshan, Chekiang; gypsum, from Germany; and coal, from Annam.

The cost of mining and transporting clay and limestone from the producing district to the Factory is put at one dollar per ton, and that for coal and gypsum at $10 and $15 a ton, respectively, not to mention the numerous expenses involved in the manufacture of cement, which is sold at only $5 a barrel.

Gypsum, a Hankow product marketed at $30 a ton, may be classified into first, second and third grades as the case may be. The first grade is white in color; the second grade, black; while the third grade contains quite a bit of impurities. Formerly the management preferred to use the gypsum from Hankow, but owing to its recent rise in price, an African product has been selected as a substitute, largely because it is marketed at only $26 a ton including all expenses. The gypsum from Germany varying from $18 to $15 a ton is extensively used for its cheapness in price as well as its superiority in quality.

Coal ranks as an important material for manufacturing cement, the quality of which largely depends upon the quantity and quality of the coal burned. Technically speaking, soft coal is little used due to the enormous quantity of carbon present during burning. Coals from Kaiping and Changhing are thus discarded while that from Tonking, Annam, is widely used for this particular purpose.

In the factory, there are two furnaces, one grinding machine and three mixing machines with varying degree of usefulness. The furnace is 56 feet in height and 2.32 feet in diameter. And it is estimated that each furnace is capable of turning out 600 barrels of cement within every 24 hours. The mixing machines varying from 50 to 500 horse power are very powerful. Lifts, cranes, transformers and packing machines carrying from 500 to 1,000 horse power are installed in the plant wherever and whenever necessary.

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Extraterritoriality

By George E. Sokolsky

SADAO SABURI

PEOPLES' EFFORTS FOR PEACE

By Kennoske Sato

THOMAS A. EDISON

By J. W. Grieve

CHINA'S INTERNAL LOAN OBLIGATIONS

By E. Kann

Vol. XXV September, 1929 No. 9

SHANGHAI, PEKING, TOKYO AND MANILA

UBE TETSUDO K.K. (Ube Railway Co., Ltd.)—The electrification work of this company, covering some 20 miles, has been nearly completed, and the electric motors ordered from Germany are expected to arrive some time during September, so that trial runs will be made before the end of September, it is reported. Operation of electrified railway will be started early in October.

CHINA'S RAILWAYS.—A program for the construction of a network of railways throughout the country to be completed in four periods has been formulated by the National Highway Planning Committee under the Chairmanship of Minister of Railways Sun Fo. The trunk lines through the interior will be completed in ten years, while those lines along the western border will be completed in twenty years. A list of the railways to be constructed in the four stages is given below :

1. First Stage.—The entire line of the Nanking-Liuchow Railway ; the Nanking-Tali section of the Nanking-Yunnan-Sikong Railway ; the Yuanto-Chengtu section of the Nanking-Tibet Railway ; the Wuchang-Lanchow section of the Foochow-Sinkiang Railway ; the Paotow-Hsining section of the Suiyuan-Sinkiang Railway.

2. Second Stage.—The Lochow-Siangyang and the Shasi-Chengtu sections of the Nanking-Yunnan-Sikong Railway ; to Foochow-Wuchang and the Lanchow-Tihwa section of the Foochow-Sinkiang Railway ; the entire line of the Nanking-Mongolia Railway ; the entire line of the Nanking-Heilungkiang Railway ; and the entire line of the Shensi-Kwangsi Railway.

3. Third Stage.—The Tali-Patang and the Changning-Cheyu sections of the Nanking-Yunnan-Sikong Railway ; the Chengtu-Jutien section of the Nanking-Tibet Railway ; the Tihwa-Ili section of the Foochow-Sinkiang Railway ; the entire line of the Chang-Yuan Railway.

4. Fourth Stage.—The entire line of the Kansu-Tibet Railway and the entire line of the Tihwa-Suchow Railway.—*Kuo Min.*

THE SIAM STATE RAILWAYS. The Siamese Government has decided to electrify the railway lines around Bangkok which will take about five years. The sanctioned program includes :—

(1) electrification of the line from Bangkok to Ban Phaji ;
(2) electrification of the Eastern line to Makasan and the River station ;
(3) electrification of the Rama VI bridge line to Taling Chan ;
(4) electrification of the Southern line from Bangkok Noi to Nakon Pathom.

The cost will run into several millions of ticals, and envisages the complete reconstruction of the existing Government Power Station. This station is to be the central distributing point ; there may be sub-stations on the lines electrified, but the power will in the first instance be generated at Samsen.

It is the intention of the Government to ask well known firms in Europe and America to prepare schemes and tenders.

The steam engines now in use in and around Bangkok and those now on order will not be scrapped because electric haul is to be substituted, since this stock will become available for the extensions on the lines to Khon Khaen and Ubol. The full complement of engines required to operate these extensions has not been ordered because the electrification scheme was under consideration.

The rolling stock as it exists at present will all be available for haulage by either means of propulsion.

Under the scheme, the reorganized Government Power Station, much of whose plant is already obsolete compared with present day power plants, will sell its current to the Railways. In this re-organization of the central power station provision will be made for the needs of the new Thonburi, which may be expected to come into being as soon as the Memorial bridge is completed. Moreover the electrification of the railway in the districts enumerated will in turn lead to the provision of the facilities for power and light being made available to towns and centers within a reasonable distance of both sides of the track.

RAILWAY PURCHASES IN CHINA.—It is learned that a sum of $1,600,000 from the returned Belgian Boxer Indemnity Fund will be used by the Ministry of Railways for the purchase of rolling-stock for the various Government railways. The greater part of the sum will be used to provide the Tsin-Pu Railway with two complete new passenger trains, and the rest will be for the purchase of a number of freight cars for distribution among the different Railway Lines.—*Kuo Min.*

NEW KIRIN-TUNGKIANG AND MISHAN-MULING LINES.—The Kirin Provincial Government, in view of the Soviet-Chinese strain demanding an enormous outlay for warlike preparations, is putting off the proposed construction of the Kirin-Tungkiang line and also the Muling-Mishan line as well.

Since the latter part of June, the surveys for the Lishuchen-Mishan section of Muling-Mishan line which is opened to traffic as far as Lishuchen have been carried out. Again, the surveys from Chuho to Fangcheng being part of the Kirin-Tungkiang line have also been finished.

SHIPPING AND SHIPBUILDING

N.Y.K. WILL EXTEND SERVICE TO MANILA.—The N.Y.K. Orient-California service will be extended at the beginning of next year, when the *Taiyo Maru, Tenyo Maru,* and *Shinyo Maru* will call at Manila. At present all the vessels on this run have Hongkong as the terminus in the Orient.

At present the service is operated with the *Korea Maru, Siberia Maru, Tenyo Maru, Taiyo Maru* and *Shinyo Maru* on a fortnightly schedule, the ports of call being Los Angeles, San Francisco, Honolulu, Yokohama, Shimizu (occasionally) Kobe, Nagasaki, Shanghai and Hongkong.

When the new motorships *Asama Maru, Chichibu Maru* and *Tatsuta Maru* are placed in the trans-Pacific service, the *Korea Maru* and *Siberia Maru* will be shifted to the company's Seattle line. The San Francisco line will then be operated with six vessels. Taking advantage of this increased accommodation and the speed of the new motor ships, 19 knots, it is planned by the company to send the *Taiyo, Tenyo* and *Shinyo Maru* as far as Manila, while the new ships will follow the present service schedule.

NEW N.K.K. RIVER STEAMER LAUNCHED AT KIANGNAN :—The *Lo Yang Maru* was launched at the Kiangnan Dock and Engineering Works on July 24

In type the *Lo Yang Maru* is unique, as being the largest in gross tonnage that has been constructed in Shanghai, expressly for the run between Shanghai and Hankow and intermediate ports. The vessel represents the combined experience of the Company's Superintendents, Captain K. Takeshita and Mr. Susukida and the builders.

The principle dimensions are :—

Length between perpendiculars ..	330 ft. 0 in.
Breadth moulded	48 ft. 0 in.
Breadth over guards	59 ft. 4 in.
Depth to upper deck	21 ft. 3 in.
Height upper to promenade deck .	8 ft. 0 in.
Height promenade deck to boat deck	8 ft. 0 in.
Guaranteed speed	15 knots
Indicated horse-power	3,300

The vessel has been designed for service on the Yangtze River as a first class passenger and cargo steamer. The hull is constructed of mild steel plates and sections tested to the requirements of the Tunshinsho Rules and the British Corporation and has been built under the special survey carried out by the surveyors of these classification societies. Broad sponsons are fitted along both sides of main deck and vessel has a straight stem and elliptical stern.

A centre lattice girder is fitted fore and aft, with six transverse watertight bulkheads, main and upper decks are complete steel decks with wood sheathing where necessary. Promenade, boat and shade decks are a combination of stringer and tie plates with wood sheathing covered with painted canvas laid over felt. The upper deck forward is sheathed with teak.

Passenger cabins are arranged on upper deck for 32 first class passengers, 38 second class and 172 third class. Cabins are arranged on the promenade deck for 20 foreign first class passengers, and 10 foreign second class passengers, also cabins for pilots and officers.

The captain's cabin and wheelhouse, smoking room, palm house cafe, lounge and Japanese social hall are constructed on the boat deck. A steel mast is fitted forward with one 10-ton derrick and two 5-ton derricks of steel tubes, with steam winches for the quick handling of heavy weights.

The *Lo Yang Maru* is driven by twin screws whose shafts are operated by two engines of the inverted direct acting triple expansion surface condensing type, turning outwards when running ahead and working on three cranks with cylinders and slide valves arranged in fore and aft line. Condenser is of the "Uniflux" type common to both engines. Air, feed and bilge pumps are driven by levers off the main engines. Three Scotch boilers fitted with Howdens forced draught working at a pressure of 200 lbs. per square inch supply amply steam to develop about 3,300 I.H.P.

Electric light is fitted throughout and current is supplied to fans, lights, electric heaters by two steam driven dynamos, one of 27 K. W. and the other 15 K. W.

The steam windlass and capstan is of Emerson and Walker's latest design. The steam steering gear is placed directly over the rudderstuck in a steel house and is of Donkin's latest type with telemotor gear and standard on navigating bridge.

The dining saloon will be finished in a fashionable and artistic manner, the side wall panellings are of five-ply oak with teak frames, the upper parts of which are covered with silk. The ceilings are panelled in five-ply brick enamelled white. The fire place is of solid teak with marble hearth set in the centre with special "Magicoal" electric fire by the General Electric Co. of China. An imitation coal fire giving a realistic flame and smoke effect throwing but considerable heat. The upholstery is in harmony of colour and good taste.

The lounge and music room in design is a combination of modern and ancient classical style. The upper part of the panelling is of birch and covered with Damask tapestry and the lower panelling is of birch with teak frames painted in white enamel for lighting effect. Overhead is a large dome skylight finished in stained leaded glass with flower design. Round this dome is arranged soft concealed strip lighting which will give a very pleasing effect. To eliminate noise the floor is covered with coloured "Rubline." The room is fitted with a grand piano, easy chairs, settees, card tables, writing desk and small chairs. A refreshment bar is arranged adjacent.

The main stairway to the first class saloon is of specially selected teak, with two Grecian Pegasus carved on the main pilasters. A clock in suitable carved panelling surmounts a specially selected picture by a famous Japanese artist, completes the design.

The smoking room is a reproduction of the Elizabethan period. The walls are panelled in teak with characteristic doors having silver plated mountings. The ceilings are panelled in birch and teak. The windows are large oblong "Crittal" windows. Four angular cosy corners are arranged in the room and mahjong tables are fitted in each. Historical shields are worked into the design of the panellings. A teak fire place in keeping with the period encloses a marble hearth and an electric imitation coal fire. This floor is also covered with delicate coloured "Rubline," and due regard has been paid to the comfort of passengers in the provision of settees and easy chairs. A leaded glass dome is fitted to this room from the centre of which hangs a beautiful bronze chandelier with electric candles giving a soft effect to the whole. Ceiling fans are fitted throughout the accommodation.

The Japanese social hall situated on the boat deck is designed by a Japanese architect and the special timber materials were imported from Japan. The floor is laid with 15 Tatamis The room is fitted with Tokonoma, Chigaidana and Shoin.

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Welcomes to Far Eastern Countries the Delegates to the World Engineering Congress, the World Power Conference and the Conference of Pacific Relations Meeting in Tokyo and Kyoto.

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遠東時報

Work of the Ministry of Railways in China

By GEORGE E. SOKOLSKY

FROM many standpoints, the principal reconstructive task in China is the rehabilitation of China's railways, the improvement of the road-bed and the rolling stock, the restoration of a modern service after years of civil war and the building of new lines to connect the vast areas of China to the eastern and central metropoli. This is the task which faces Mr. Sun Fo, Minister of Railways, who inherits a system which had depreciated during a decade of civil war. The Ministry of Railways at present controls 9,980.316 kilometers of trackage, according to Table I.

TABLE I*.—KILOMETERS OF RAILWAY OPERATED, CLASSIFIED BY USE AND DISTRIBUTED BY LINES

Names of Lines		Main Line	Branch Lines	Second Track, Industrial Track, Loops, Sidings, etc.	Total Track
Peping-Hankow		1,214.493	109.684	405.923	1,730.100
Peping-Mukden		846.737	128.097	445.125	1,419.959
Tientsin-Pukow		1,012.840	96.470	262.870	1,372.180
Shanghai-Nanking		311.040	16.093	88.020	415.153
Shanghai-H.-N.		280.652	5.880	66.275	352.807
Peping-Suiyuan		817.862	58.669	264.905	1,141.436
Cheng-Tai		242.950	-	107.533	350.483
Taokow-Chinghua		150.000	2.440	31.380	183.820
Kaifeng-Honan		184.001	-	37.758	221.759
Lung-Hai		613.386	-	101.277	714.663
Kirin-Changchun		123.180	4.560	34.340	162.080
Canton-Kowloon		143.300	-	20.570	163.870
Hupeh-Hunan		417.624	5.021	44.652	467.297
Ssu-Tao		312.110	114.130	76.210	502.450
Kiao-Tsi		395.200	58.099	188.142	641.441
Nanchang-Kiukiang		128.346	——	12.472	140.818
Chinese Government Railways	1926	7,193.721	599.143	2,187.452	9,980.316
	1925	6,644.537	602.807	2,114.705	9,362.049
	1924	6,938.070	607.938	2,086.746	9,632.754
	1923	6,780.836	493.046	1,992.414	9,266.296
	1922	6,193.739	430.412	1,743.911	8,368.062

These railways represent a constructional investment of $704,366,113.17 and a financial investment of $91,947,027.94 making a total investment, after deducting receipts on capital account of $771,217,544.94 or $75 per kilometer. Table II herewith gives these investment assets in detail as to each railway owned by the Ministry.

TABLE III.—COST OF ROAD AND EQUIPMENT

Name of Line		Kilometer of Line Owned	Cost of Road and Equipment	Cost Per Kilometer of Line Owned
Peping-Hankow		1,314.046	123,634,611.81	94,086.97
Peping-Mukden		986.853	106,069,811.25	107,504.68
Tientsin-Pukow		1,109.310	120,118,576.47	108,282.24
Shanghai-Nanking		327.133	33,581,904.12	102,655.20
Shanghai-H.-N.		286.532	24,502,078.43	85,512.54
Peping-Suiyuan		871.957	57,902,324.42	66,405.02
Cheng-Tai		242.950	25,936,886.23	106,758.12
Taokow-Chinghua		152.440	8,355,071.94	54,808.92
Kaifeng-Honan		184.001	15,637,965.03	84,988.48
Lung-Hai		(2)	——	——
Kirin-Changchun		123.610	8,976,654.38	72,620.78
Canton-Kowloon		143.300	15,885,199.27	110,852.75
Hupeh-Hunan		422.645	59,340,071.94	140,401.69
Ssu Tao		424.919	20,330,614.89	47,846.87
Kiao-Tsi		453.299	39,054,239.35	86,155.58
Nanchang-Kiukiang		128.346	11,891,535.41	92,652.17
Chinese Government Railways	1926	7,171.132	771,217,544.94	107,544.74
	1925	6,625.576	594,380,168.49	89,709.96
	1924	7,050.667	642,714,011.00	91,156.48
	1923	6,826.923	629,073,565.13	92,145.99
	1922	6,253.133	563,497,724.06	90,114.46

The actual cost of the equipment of these lines in 1926 was $107,544.75 for 7,171.132 kilometers.

The operating and income accounts show the possibilities of the lines. It must here be noted that the Ministry of Railways has only recently come into control of all the railways. Like his colleague, Mr. T. V. Soong, Mr. Sun Fo has been beset by military interference with his railways and his work. It was only during the month of July that he succeeded in completing his control of the Northern railways. Table IV then represents the report of an incomplete success; yet, how much better might it have been for China, had the Ministry of Railways operated unhampered by the interference of the militarists. The outstanding success among Chinese Government railways is the Peping-Mukden Line which made a profit of $7,855,251.45. Yet the total profit for all the railways, based on an operating revenue of $99,341,879.30 was only $3,495,702.97.‡ The smallness of the profit can only be explained by military interference.

*All references to currency is to be taken to mean Chinese currency unless otherwise indicated.

‡See also Table VIII.

TABLE II.—DISTRIBUTION OF INVESTMENT ASSETS

Items	Cheng-Tai	Taokow-Chinghua	Kaifeng-Honan	Lung-Hai	Kirin-Changchun	Canton-Kowloon
PART I.—CONSTRUCTION ACCOUNTS :—						
C—1 General Expenditures	3,308,206.37	1,727,949.83	1,905,620.63	(2)	1,014,278.84	1,571,475.75
C—2 Preliminary Expenditure	601,750.89	30,598.09	72,683.10		45,894.89	100,875.65
C—3 Land	325,728.50	379,820.69	298,462.27		242,650.79	1,690,631.47
C—4 Formation	2,613,940.48	126,975.50	1,487,930.63		692,284.05	2,089,839.34
C—5 Tunnels	590,214.99	..	489,482.21		238,174.04	..
C—6 Bridgeworks	2,205,290.31	385,697.51	2,896,908.09		740,581.72	2,300,563.44
C—7 Line Protection	62,027.26	3,417.36	13,517.31		1,425.43	70,650.89
C—8 Telegraphs and Telephones	148,783.10	43,645.98	37,969.19		131,246.96	34,398.52
C—9 Track	3,406,502.82	1,783,181.85	2,844,210.67		1,789,576.12	2,749,965.87
C—10 Signal and Switches	370,427.02	103,023.33	169,601.17		130,905.51	77,256.03
C—11 Stations and Buildings	2,425,695.40	381,561.53	745,221.78		1,517,981.20	1,002,303.12
C—12 Central Mechanical Works	888,944.13	147,249.98	..		379,119.26	91,755.06
C—13 Special Mechanical Works	24,892.81	10,473.91	..		..	..
C—14 Plant	441,842.08	8,782.00	424,009.71		80,557.95	247,035.86
C—15 Rolling Stock	6,434,176.61	2,078,159.30	3,235,824.78		1,729,599.49	1,387,884.09
C—16 Maintenance	177,104.05	..	139,531.11		21,963.43	9,842.18
C—17 Docks, Harbors and Wharves	..	..	..		..	779.06
C—18 Floating Equipments	..	..	..		..	..
Total Part I	24,085,526.82	7,210,536.86	14,760,972.63		8,756,237.79	13,425,256.33
PART II.—FINANCIAL ACCOUNTS :—						
C—19 Interest During Construction	2,996,120.17	438,799.97	2,802,156.73		606,304.98	2,095,603.14
C—20 Exchange	469,015.77	705,735.11	..		43,705.33 *Less*	85,337.60
C—21 Unclassified	..	..	..		..	449,677.40
Total Part II	3,465,135.94	1,144,535.08	1,585,323.59		650,010.31	2,459,942.94
Total Part I and II	27,550,662.76	8,355,071.94	16,346,296.22		9,406,248.10	15,885,199.27
Deduct Receipts on Capital Account	1,613,776.53	..	708,331.19		429,593.72	..
Total Cost of Road and Equipment	25,936,886.23	8,355,071.94	15,637,965.03		8,976,654.38	15,885,199.27
Cost of Other Physical Property	..	..	..		24,387.08	..
Cost of Non Physical Assets	..	..	..		40,670.00	..
Total Cost of Property Carried to Balance Sheet	25,936,886.23	8,355,071.94	15,637,965.03		9,041,711.46	15,885,199.27

(2) Under Construction

TABLE II.—DISTRIBUTION OF INVESTMENT ASSETS—*(Continued)*

Items	*Hupeh-Hunan*	*Ssu-Tao*	*Kiao-Tsi*	*Nanchang-Kiukiang*	*Chinese Government Railways*
PART I.—CONSTRUCTION ACCOUNTS:—					
C—1 General Expenditures	6,468,810.28	2,783,623.27	..	1,701,601.88	58,027,292.23
C—2 Preliminary Expenditure	5,535,733.56	101,420.01	..	309,600.43	10,005,542.99
C—3 Land	2,178,982.19	710,337.09	1,735,389.90	441,795.09	25,344,897.64
C—4 Formation	3,957,632.81	1,386,668.48	1,591,567.40	1,021,696.53	40,892,066.27
C—5 Tunnels	..	..	..	..	3,009,845.55
C—6 Bridgeworks	5,509,584.22	2,338,816.64	7,061,662.49	2,445,804.28	90,157,791.15
C—7 Line Protection	91,992.57	26,198.31	59,932.20	6,366.87	1,410,523.90
C—8 Telegraphs and Telephone	159,938.20	419,796.64	714,808.99	25,897.32	3,716,433.15
C—9 Track	6,852,434.99	7,554,301.69	8,270,748.78	1,705,242.64	27,442,446.39
C—10 Signal and Switches	175,429.60	262,557.73	280,938.51	38,757.23	7,873,236.07
C—11 Stations and Buildings	1,383,521.78	3,180,455.17	3,637,383.75	355,335.03	48,807,360.31
C—12 Central Mechanical Works	415,008.97	..	2,364,450.17	56,279.42	13,060,609.64
C—13 Special Mechanical Works	7,657.16	..	200,305.79	195.72	1,257,069.42
C—14 Plant	374,943.98	202,369.51	134,919.26	142,315.15	5,271,611.72
C—15 Rolling Stock	5,233,439.59	..	13,002,132.11	871,525.68	57,464,342.53
C—16 Maintenance	1,016,798.45	292,152.66	..	300,092.44	7,519,345.21
C—17 Docks, Harbors and Wharves	84,208.51	..	..	..	2,211,314.18
C—18 Floating Equipments	18,795.90	..	..	25,464.50	894,384.82
Total Part I	40,464,912.76	19,259,099.35	39,054,239.35	9,447,970.21	704,366,113.17
PART II.—FINANCIAL ACCOUNTS:—					
C—19 Interest During Construction	18,732,556.61	1,874,612.51	..	2,419,026.41	67,882,311.39
C—20 Exchange	2,854,074.01	1,507,392.01 *Less*	..	170,719.14	1,663,424.82
C—21 Unclassified	..	1,311,329.73	..	..	22,421,291.73
Total Part II	21,586,630.62	1,588,550.23	..	2,589,745.55	91,947,027.94
Total Part I and II	62,051,543.38	20,847,649.43	39,054,239.35	12,037,715.76	796,313,141.11
Deduct Receipts on Capital Account	2,711,471.14	517,034.54	..	146,180.35	25,095,596.17
Total Cost of Road and Equipment	59,340,071.94	20,330,614.89	39,054,239.35	11,891,535.41	771,217,544.94
Cost of Other Physical Property	..	..	..	..	..
Cost of Non Physical Assets	50,500.00	..	2,300.00	..	..
Total Cost of Property Carried to Balance Sheet	59,390,571.94	20,330,614.89	39,056,539.35	11,891,535.41	771,217,544.94

TABLE IV.—CONDENSED OPERATING AND INCOME ACCOUNTS

Items	*Peping-Hankow* Totals	Balances	*Peping-Mukden* Totals	Balances	*Tientsin-Pukow* Totals	Balances
Operating Revenues	$14,739,136.89		$23,487,168.68		$6,119,258.16	
Operating Expenses	11,874,787.19		13,598,979.78		5,838,625.19	
Net Operating Revenues		2,864,349.70		9,888,188.90		280,632.97
Income Debits	4,619,207.68		2,269,992.60		4,103,033.46	
Income Credits	544,728.16		237,055.15		11,009.15	
Net Income Debits		4,074,479.52		2,032,937.45		4,092,024.31
Credit (or Debit) Balance for the Year		*1,210,129.82		7,855,251.45		* 3,811,391.34

Items	*Shanghai-Nanking* Totals	Balances	*Shanghai-Hangchow-Ningpo* Totals	Balances	*Peping-Suiyuan* Totals	Balances
Operating Revenues	$9,157,252.39		$4,978,625.88		$5,124,348.44	
Operating Expenses	5,805,866.18		3,553,958.09		5,967,506.84	
Net Operating Revenues		3,351,386.21		1,424,667.79		* 783,158.40
Income Debits	1,838,390.99		610,954.69		3,183,129.59	
Income Credits	62,367.10		204,680.32		6,542.70	
Net Income Debits		1,776,023.89		406,274.37		3,176,586.89
Credit (or Debit) Balance for the Year		1,575,362.32		1,918,393.42		* 3,959,745.29

Items	*Cheng-Tai* Totals	Balances	*Taokow-Chinghua* Totals	Balances	*Kaifeng-Honan* Totals	Balances
Operating Revenues	$5,111,230.74		$1,095,502.84		$2,688,853.12	
Operating Expenses	2,149,656.32		659,500.19		1,064,381.57	
Net Operating Revenues		2,961,583.42		436,002.65		1,624,471.55
Income Debits	173,695.15		618,377.89			
Income Credits	47,873.08		3,055.19			
Net Income Debits		125,822.07		615,322.70		
Credit (or Debit) Balance for the Year		2,835,761.35		* 179,320.05		

* Denotes Loss or Debit Balance

Items	*Lung-Hai* Totals	Balances	*Kirin-Changchun* Totals	Balances	*Canton-Kowloon* Totals	Balances
Operating Revenues	$4,491,580.87		$2,914,323.25		$1,686,096.60	
Operating Expenses	2,291,969.76		1,989,942.45		1,159,978.69	
Net Operating Revenues		2,199,611.11		924,380.80		526,117.91
Income Debits			850,421.94		620,997.86	
Income Credits			119,966.46		11,332.43	
Net Income Debits	(1)			730,455.48		609,665.43
Credit (or Debit) Balance for the Year				193,925.32		* 83,547.52

Items	*Hupeh-Hunan* Totals	Balances	*Ssu-Tao* Totals	Balances	*Kiao-Tsi* Totals	Balances
Operating Revenues	$1,061,902.67		$7,675,284.43		$8,085,500.70	
Operating Expenses	1,976,295.08		3,684,811.95		6,946,148.49	
Net Operating Revenues		* 914,392.41		3,990,472.48		1,139,352.21
Income Debits	2,656,735.39		4,511,761.31		2,611,650.71	
Income Credits	43,874.98		1,496,362.74		263,369.74	
Net Income Debits		2,612,860.41		3,015,398.57		2,348,280.97
Credit (or Debit) Balance for the Year		* 3,527,252.82		975,073.91		* 1,208,928.76

* Loss or debit balance

(1) Under Construction (2) Includes $2,199,611.11 Net Revenues of Lung-Hai which must be credited to Construction costs.

TABLE IV.—CONDENSED OPERATING AND INCOME ACCOUNTS.—*(Continued)*

Items	*Nanchang-Kiukiang Totals*	*Nanchang-Kiukiang Balances*	*Chinese Government Totals*	*Railways Balances*
Operating Revenues	$865,804.64		$99,341,879.30	
Operating Expenses	728,793.37		69,291,201.14	
Net Operating Revenues		137,011.27		30,050,678.16
Income Debits	979,376.35		29,647,725.61	
Income Credits	40,533.22		3,092,750.42	
Net Income Debits		938,843.13		26,554,975.19
Credit (or Debit) Balance for the Year		* 801,831.86		3,495,702.97

TABLE V.—ANALYSIS OF OPERATING REVENUES

Items	*Peping-Hankow Amount*	%	*Peping-Mukden Amount*	%	*Tientsin-Pukow Amount*	%
I.—Transportation Revenues	$14,296,562.76		$23,057,918.81		$6,026,024.67	
R—1 Passenger Service—Passengers	$4,153,017.71	28.18	8,946,767.00	38.09	1,213,302.27	64.53
R—2 Passenger Service—Other	292,610.53	1.99	1,026,878.92	4.37	274,124.28	4.48
R—3 Goods Service—Goods	9,277,828.65	62.96	12,104,311.02	51.53	1,483,815.74	24.25
R—4 Goods Service—Other	573,105.87	3.89	978,765.96	4.17	54,760.58	0.90
R—5 Ferry Service			1,195.91	0.01	21.80	(1)
II.—Other Operating Revenues	442,574.13		424,922.17		93,233.49	
R—6 Telegraph	‡ 388.45	(1)	78,120.09	0.33	5,005.65	0.08
R—7 Profits of Central Mechanical Works	11,068.20	0.08	1,479.32	0.01	324.12	(1)
R—8 Rents	307,417.50	2.05	277,948.59	1.18	63,847.49	1.05
R—9 Incidental Revenues	124,476.88	0.85	67,374.17	0.29	24,056.23	0.39
III.—R—10 Auxiliary Operations			4,327.70	0.02		
IV.—R—11 Interchange of Rolling Stock						
Total Operating Revenues	14,739,136.89	100.00	23,487,168.68	100.00	6,119,258.16	100.00

Items	*Shanghai-Nanking Amount*	%	*Shanghai-Hangchow-Ningpo Amount*	%	*Peping-Suiyuan Amount*	%
I.—Transportation Revenues	$9,014,168.89		$4,921,790.46		$4,715,711.41	
R—1 Passenger Service—Passenger	5,909,342.06	64.53	$3,111,399.20	62.49	$1,459,922.53	28.16
R—2 Passenger Service—Other	488,228.96	5.33	438,444.13	8.81	119,404.20	2.30
R—3 Goods Service—Goods	2,213,546.32	24.17	1,305,225.32	26.22	3,048,375.49	58.80
R—4 Goods Service—Others	403,051.55	4.40	66,721.81	1.34	88,000.19	1.70
R—5 Ferry Service						
II.—Other Operating Revenues	125,690.42		58,594.04		468,637.03	
R—6 Telegraph	604.20	0.01	1,926.84	0.04	1,799.14	0.04
R—7 Profits of Central Mechanical Works	6,533.16	0.07				
R—8 Rents	19,351.92	0.21	10,024.94	0.20	225,750.78	4.35
R—9 Incidental Revenues	40,642.26	0.94	241,087.11	4.65	16,213.21	0.32
III.—R—10 Auxiliary Operations	3,121.78	0.04	‡1,758.62	0.04		
IV.—R—11 Interchange of Rolling Stock	14,271.30	0.16				
Total Operating Revenue	9,157,252.39	100.00	$4,978,625.88	100.00	$5,184,348.44	100.00

(1) Denotes Less than .01 per cent.

Items	*Cheng-Tai Amount*	%	*Taokow-Chinghua Amount*	%	*Kaifeng-Honon Amount*	%
I.—Transportation Revenues	$5,007,508.84		$1,072,619.58		$2,647,974.51	
R—1 Passenger Service—Passenger	$ 909,336.10	17.79	$219,315.44	20.02	$963,613.10	35.84
R—2 Passenger Service—Other	83,637.75	1.64	57,774.81	5.27	245,798.38	9.14
R—3 Goods Service—Goods	3,753,562.99	73.44	605,111.56	55.24	654,615.23	24.35
R—4 Goods Service—Other	260,972.00	5.10	190,417.77	17.38	783,947.80	29.15
R—5 Ferry Service						
II.—Other Operating Revenues	103,730.90		22,883.26		40,878.61	
R—6 Telegraph			523.50	0.05	71.97	(1)
R—7 Profits of Central Mechanical Works			4,518.42	0.41	16,564.86	0.62
R—8 Rents	87,517.69	1.71	11,976.52	1.09	11,172.16	0.41
R—9 Incidental Revenues	16,213.21	0.32	5,864.82	0.54	13,069.62	0.49
III.—R—10 Auxiliary Operations						
IV.—R—11 Interchange of Rolling Stock						
Total Operating Revenue	5,111,239.74	100.00	$1,095,502.84	100.00	$2,688,853.12	100.00

Items	*Lung-Hai Amount*	%	*Kirin-Changchun Amount*	%	*Canton-Kowloon Amount*	%
I.—Transportation Revenues	$4,430,025.73		$2,855,316.60		$1,671,127.34	
R—1 Passenger Service—Passenger	$1,534,834.55	34.17	$927,925.61	31.84	$1,398,673.87	82.95
R—2 Passenger Service—Other	284,212.12	6.33	30,360.42	1.04	9,465.79	0.56
R—3 Goods Service—Goods	2,221,962.48	49.47	1,696,363.56	68.21	262,981.68	15.60
R—4 Goods Service—Other	389,016.58	8.66	200,667.01	6.88	6.00	(1)
R—5 Ferry Service						
II.—Other Operating Revenues	59,265.14		45,528.80		14,969.26	
R—6 Telegraph	156.41	(1)	3,453.61	0.12		
R—7 Profits of Central Mechanical Works	32,464.87	0.72	879.61	0.03	7.54	(1)
R—8 Rents	16,864.53	0.38	8,930.49	0.31	6,734.58	0.40
R—9 Incidental Revenues	9,779.33	0.22	32,265.09	1.11	8,227.14	0.19
III.—R—10 Auxiliary Operations	2,290.00	0.05				
IV.—R—11 Interchange of Rolling Stock			13,477.85	0.46		
Total Operating Revenues	4,491,580.87	100.00	$2,914,323.25	100.00	$1,686,096.60	100.00

(1) Not less than 0.1 per cent.

* Loss or debit balance

‡ Decrease.

Table V.—Analysis of Operating Revenues.—*(Continued)*

Items	*Hupeh-Hunan* Amount	%	*Ssu-Tao* Amount	%	*Kiao-Tsi* Amount	%
I.—Transportation Revenues	$1,049,450.41		$7,654,170.77		$7,907,522.36	
R—1 Passenger Service—Passenger	$372,734.00	35.10	$1,699,719.82	22.15	$2,684,976.81	33.21
R—2 Passenger Service—Other	19,874.07	1.87	42,938.94	0.56	136,462.12	1.69
R—3 Goods Service—Goods	628,479.08	59.19	5,689,453.31	74.13	5,002,018.73	35.89
R—4 Goods Service—Other	28,363.26	2.67	222,058.70	2.89	84,064.70	1.04
R—5 Ferry Service	..		..		..	
II.—Other Operating Revenues	12,452.26		21,113.66		157,315.34	
R—6 Telegraph	3,066.09	0.29	3,309.90	0.04	4,948.21	0.06
R—7 Profits of Central Mechanical Works	..		..		..	
R—8 Rents	4,226.05	0.40	1,330.20	0.02	2,142.00	0.02
R—9 Incidental Revenues	5,160.12	0.48	16,473.56	0.21	150,225.13	1.86
III.—R—10 Auxiliary Operations	..		..		..	
IV.—R—11 Interchange of Rolling Stock	..		..		20,663.00	0.26
Total Operating Revenues	1,061,902.67	100.00	$7,675,284.43	100.00	$8,085,500.70	100.00

Items	*Nanchang-Kiukiang* Amount	%	*Chinese Government Railways* Amount	%
I.—Transportation Revenues	$860,529.64		$97,188,422.78	97.83
R—1 Passenger Service—Passenger	$493,270.95	56.97	$38,998,151.02	
R—2 Passenger Service—Other	51,445.18	5.94	3,601,660.60	
R—3 Goods Service—Goods	310,754.23	35.89	50,258,405.39	
R—4 Goods Service—Others	4,841.38	0.56	4,328,770.16	
R—5 Ferry Service	217.90	0.03	1,435.61	
II.—Other Operating Revenues	5,275.00		2,097,063.51	2.11
R—6 Telegraph	..		102,597.16	
R—7 Profits of Central Mechanical Works	..		73,840.10	
R—8 Rents	..		1,055,235.44	
R—9 Incidental Revenues	5,275.00	0.61	865,390.81	
III.—R—10 Auxiliary Operations	..		7,980.86	0.01
IV.—R—11 Interchange of Rolling Stock	..		48,412.15	0.05
Total Operating Revenues	$865,804.64	100.00	$99,341,879.30	100.00

Table VI.—Analysis of Operating Expenses

Items	*Peping-Hankow* Amount	%	*Peping-Mukden* Amount	%	*Tientsin-Pukow* Amount	%
E—1 General Expenses	$3,656,977.13		$3,012,296.13		$1,881,249.46	32.22
Administration	$1,915,191.82	16.13	$1,226,895.14	9.03	$1,166,707.11	
Special	1,741,785.31	14.67	1,785,400.99	13.13	714,542.35	
E—2 Traffic Expenses	1,844,478.30	15.53	1,848,552.21	13.59	747,016.51	12.79
E—3 Running Expenses	2,364,606.69		3,161,424.33		1,184,735.56	20.29
Locomotive	1,624,305.94	13.68	2,722,466.37	20.02	939,033.84	
Carriage and Wagon	143,420.26	1.21	143,086.54	1.05	82,109.37	
Motor Vehicles	—		...		...	
Traffic	588,117.65	4.95	282,281.48	2.08	163,592.35	
Flotilla	8,762.84	0.07	13,589.94	0.10	...	
E—4 Maintenance of Equipment	2,192,731.89		3,259,978.03		1,227,192.80	21.02
Locomotive Department	2,192,731.89	18.47	3,257,548.18	23.95	1,227,192.80	
Flotilla Department	...		2,429.85	0.02	...	
E—5 Maintenance of Way and Structures	1,815,993.18		2,314,729.08		798,189.36	13.67
Engineering Department	1,653,101.37	13.92	1,932,465.26	14.21	645,273.38	
Other Department	162,891.81	1.37	382,263.82	0.01	152,915.98	
E—6 Interchange Of Rolling Stock	...		2,000.00	0.01	241.50	0.01
Total Operating Expenses	$11,874,787.19	100.00	$13,598,979.78	100.00	$5,838,625.19	100.00

Items	*Shanghai-Nanking* Amount	%	*Shanghai-Hangchow-Ningpo* Amount	%	*Peping-Suiyuan* Amount	%
E—1 General Expenses	$924,809.35	15.93	$625,211.52	17.59	$1,840,737.61	30.85
Administration	$427,255.50		$302,634.11		$783,136.86	
Special	497,553.85		322,577.41		1,057,600.75	
E—2 Traffic Expenses	1,295,975.57	22.32	625,390.40	17.88	714,291.84	11.97
E—3 Running Expenses	1,694,817.19	29.19	935,093.26	26.31	1,027,814.94	17.22
Locomotive	1,506,807.08		856,012.14		854,466.40	
Carriage and Wagon	53,962.32		28,872.79		91,068.43	
Motor Vehicles	...		...		...	
Traffic	134,047.79		50,208.33		82,280.11	
Flotilla	...		...		...	
E—4 Maintenance of Equipment	1,092,434.57	18.82	580,988.75	16.35	1,341,961.97	22.49
Locomotive Department	1,092,434.57		580,988.75		1,341,961.97	
Flotilla Department	...		...		...	
E—5 Maintenance of Way and Structures	797,829.50	13.74	763,002.86	21.47	1,042,700.48	17.47
Engineering Department	739,663.06		741,474.88		930,552.83	
Other Department	58,166.44		21,527.98		112,147.65	
E—6 Interchange Of Rolling Stock	...		14,271.30	0.40	...	
Total Operating Expenses	$5,805,866.18	100.00	$3,553,958.09	100.00	$5,967,506.84	100.00

TABLE VI.—ANALYSIS OF OPERATING EXPENSES.—*(Continued)*

Items	*Cheng-Tai* Amount		%	*Taokow-Chinghua* Amount		%	*Kaifeng-Honan* Amount		%
E—1 General Expenses		$423,238.30			$261,956.68	39.72		$252,436.71	
Administration	$261,180.07		12.15	$137,627.46			$170,608.16		16.03
Special	162,058.23		7.54	124,329.22			81,828.55		7.69
E—2 Traffic Expenses		252,062.24	11.73		71,838.51	10.89		110,241.05	10.36
E—3 Running Expenses		346,347.99			111,129.70	16.85		196,243.10	
Locomotive	260,317.42		12.11	93,856.37			147,930.84		13.90
Carriage and Wagon	10,663.80		0.50	4,789.58			4,968.77		0.47
Motor Vehicles	...			...			...		
Traffic	75,366.77		3.50	12,483.75			42,343.49		3.97
Flotilla	...			...			...		
E—4 Maintenance of Equipment		717,929.29	33.40		115,981.22	17.59		294,555.25	
Locomotive Department	717,929.29			115,981.22			294,555.25		27.67
Flotilla Department	...			...			...		
E—5 Maintenance of Way and Structures		410,078.50			98,594.08	14.95		211,905.46	
Engineering Department	397,082.21		18.47	95,426.96			202,855.87		19.06
Other Department	12,996.29		0.60	3,167.12			9,049.59		.85
E—6 Interchange Of Rolling Stock		...			...			...	
Total Operating Expenses		$2,149,656.32	100.00		$659,500.19	100.00		$1,064,381.57	100.00

Items	*Lung-Hai* Amount		%	*Kirin-Changchun* Amount		%	*Canton-Kowloon* Amount		%
E—1 General Expenses		$540,844.44			$501,084.47			$245,137.59	21.13
Administration	$335,298.46		14.63	$220,799.71		11.16	$135,267.75		
Special	205,545.98		8.97	280,284.76		14.08	109,869.84		
E—2 Traffic Expenses		267,816.32	11.68		348,748.20	17.52		145,341.56	12.53
E—3 Running Expenses		417,058.58			342,094.01			322,263.52	27.78
Locomotive	337,096.27		14.71	313,695.59		15.76	293,665.60		
Carriage and Wagon	10,861.57		0.47	11,962.00		0.60	8,163.89		
Motor Vehicles	...			...			1,600.59		
Traffic	69,100.74		3.02	16,436.42		0.83	18,833.44		
Flotilla	...			...			...		
E—4 Maintenance of Equipment		538,430.69			394,145.34			185,098.83	15.96
Locomotive Department	538,430.69		23.49	394,145.34		19.81	185,098.83		15.96
Flotilla Department	...			...			...		
E—5 Maintenance of Way and Structures		527,819.73			403,870.43			262,137.19	22.60
Engineering Department	506,701.21		22.11	375,283.39		18.86	260,347.04		
Other Department	21,118.52		0.92	28,587.04		1.44	1,790.15		
E—6 Interchange Of Rolling Stock		...			...			...	
Total Operating Expenses		$2,291,969.76	100.00		$1,989,942.45	100.00		$1,159,978.69	100.00

Items	*Hupeh-Hunan* Amount		%	*Ssu-Tao* Amount		%	*Kiao-Tsi* Amount		%
E—1 General Expenses		$422,621.57	21.38		$805,565.94			$1,984,288.82	28.57
Administration	$288,463.46			$432,916.35		11.75	$1,012,824.70		
Special	134,158.11			372,649.59		10.11	971,464.12		
E—2 Traffic Expenses		232,310.26	11.76		603,676.59	16.38		919,821.68	13.24
E—3 Running Expenses		436,933.61	22.11		841,644.83			1,298,660.34	18.70
Locomotive	355,934.05			739,940.48		20.08	1,109,167.38		
Carriage and Wagon	27,798.35			38,002.75		1.03	56,011.43		
Motor Vehicles	...			...			...		
Traffic	50,993.09			63,701.60		1.73	133,481.53		
Flotilla	2,208.12			...			...		
E—4 Maintenance of Equipment		398,820.58	20.18		335,345.30	9.10		1,813,185.76	26.10
Locomotive Department	398,820.58		20.18	335,345.30			1,813,185.76		26.10
Flotilla Department	...			...			...		
E—5 Maintenance of Way and Structures		479,227.31	24.25		862,798.55			930,191.89	13.39
Engineering Department	463,299.79			834,090.95		22.64	805,154.77		
Other Department	15,927.52			28,707.60		0.78	125,037.12		
E—6 Interchange Of Rolling Stock		6,381.75	0.32		235,780.74	6.40		...	
Total Operating Expenses		$1,976,295.08	100.00		$3,684,811.95	100.00		$6,946,148.49	100.00

Items	*Nanchang-Kiukiang* Amount		%	*Chinese Government Railways* Amount		%
E—1 General Expenses		$177,181.93	24.30		$17,555,637.65	25.33
Administration	$106,521.71			$8,923,328.37		
Special	70,660.22			8,632,309.28		
E—2 Traffic Expenses		90,534.00	12.42		10,128,095.24	14.62
E—3 Running Expenses		189,737.03	26.07		14,869,604.68	21.46
Locomotive	158,376.08			12,313,071.85		
Carriage and Wagon	2,297.91			718,039.76		
Motor Vehicles	...			1,600.59		
Traffic	12,481.90			1,795,750.44		
Flotilla	16,581.14			41,142.04		
E—4 Maintenance of Equipment		127,533.01	17.49		14,616,313.28	21.09
Locomotive Department	122,175.94			14,608,526.36		
Flotilla Department	5,357.07			7,786,92		
E—5 Maintenance of Way and Structures		143,807.40	19.72		11,862,875.00	17.13
Engineering Department	135,171.97			10,717,944.94		
Other Department	8,635.43			1,144,930.06		
E—6 Interchange of Rolling Stock		...			258,675.29	0.37
Total Operating Expenses		$728,793.37	100.00		$69,291,201.14	100.00

TABLE VII.—ANALYSIS OF INCOME DEBIT AND CREDIT ENTRIES.

Items	*Peping-Hankow*	*Peping-Mukden*	*Tientsin-Pukow*	*Shanghai-Nanking*	*Shanghai-H.-N.*	*Peping-Suiyuan*
Accrued Credits to Income						
I—1 Balance, Net Operating Revenue	$2,864,349.70	$9,888,188.90	$ 280,632.97	$3,351,386.21	$1,424,667.79	...
I—2 Income from Securities	25,101.00	...	766.38	410.96	...	2,008.26
I—3 Interest	480,927.31	30,108.65	3,545.03	14,235.82	10,368.48	1,658.98
I—4 Profit on Industrial Investments	...	...	...	...	...	...
I—5 Rents Receivable	37,364.01	44,603.56	6,253.00	47,161.79	193,889.27	...
I—6 Exchange, Net Credit	1,335.81	161,238.16	439.39	...	...	2,865.17
I—7 Miscellaneous Credits	0.03	1,104.78	5.35	558.53	422.57	10.29
Total Credit to Income	$3,409,077.86	$10,125,244.05	$291,642.12	$3,413,753.31	$1,629,348.11	6,542.70
Accrued Charges Against Income						
I—8 Balance, Net Operating Loss	...	...	...	...	...	783,158.40
I—9 Interest on Funded Debt	1,633,378.14	526,139.42	3,320,333.54	1,476,787.40	477,815.04	828,890.96
I—10 Interest on Current Debt	2,737,153.09	894,540.03	234,863.42	...	...	2,316,883.98
I—11 Contractual Dividends	...	...	...	...	...	...
I—12 Government Interest	...	...	...	91,434.70	...	...
I—13 Loss On Industrial Investments	363.99	...	...	...	...	...
I—14 Amortization of Discount on Funded Debt	177,143.87	75,900.00	...	49,608.26	59,605.88	...
I—15 Taxes	50,509.04	11,936.28	...	424.05	842.79	...
I—16 Rent Payable	11,418.20	20,802.16	538,525.00	175,728.15	8,551.16	2,685.00
I—17 Discount on Depreciated Currency	7,440.46	4,243.61	6,374.46	25,573.71	5,390.97	32,886.62
I—18 Exchange, Net Debit	1,778.89	733,977.39	855.32	18,758.68	25,645.35	1,783.03
I—19 Miscellaneous Debits	22.00	2,453.71	2,081.72	66.04	33,193.50	...
Total Debits to Income	$4,619,207.68	$2,269,992.60	$4,103,033.46	$1,838,390.99	$610,954.69	$3,966,287.99
Credit (or Debit) Balances of the Year	*1,210,129.82	7,855,251.45	*3,811,391.34	1,575,391.34	1,575,362.32	1,018,393.42

Items	*Cheng-Tai*	*Taokow-Chinghua*	*Kaifeng-Honan*	*Lung-Hai*	*Kirin-Changchun*	*Canton-Kowloon*
Accrued Credits to Income						
I—1 Balance, Net Operating Revenue	$2,961,583.42	$436,002.65	...	(1)	$924,380.80	$526,117.91
I—2 Income from Securities	...	...	...	...	...	...
I—3 Interest	35,505.58	2,718.61	...	...	19,568.22	2,883.78
I—4 Profit on Industrial Investments	...	...	...	...	...	...
I—5 Rents Receivable	7,643.85	30.00	...	...	36,314.35	3,620.63
I—6 Exchange, Net Credit	69.33	74.95	...	...	56,061.94	4,736.23
I—7 Miscellaneous Credits	4,654.32	231.63	...	...	8,021.95	91.79
Total Credit to Income	$3,009,456.50	$439,057.84	...	...	$1,044,347.26	$537,450.34
Accrued Charges Against Income						
I—8 Balance, Net Operating Loss	...	...	...	...	...	...
I—9 Interest on Funded Debt	73,349.45	309,423.44	...	...	331,018.51	512,349.15
I—10 Interest on Current Debt	447.50	3.64	...	...	...	14,414.53
I—11 Contractual Dividends	...	...	...	...	...	...
I—12 Government Interest	...	299,215.74	...	...	126,717.51	...
I—13 Loss On Industrial Investments	...	...	...	...	6,719.30	...
I—14 Amortization of Discount on Funded Debt	95,000.00	1,609.02	...	...	15,235.50	33,000.00
I—15 Taxes	...	...	...	...	...	14.15
I—16 Rent Payable	...	6,951.00	...	...	75,186.38	...
I—17 Discount on Depreciated Currency	3,209.59	...	...	...	...	...
I—18 Exchange, Net Debit	115.18	1,101.51	...	...	294,415.93	47,407.96
I—19 Miscellaneous Debits	1,573.43	73.54	...	...	1,128.81	13,812.07
Total Debits to Income	$173,695.15	$618,377.89	...	...	$850,421.94	$620,997.86
Credit (or Debit) Balances of the Year	2,835,761.35	* 179,320.05	...	...	193,925.32	*83,547.52

Items	*Hupeh-Hunan*	*Ssu-Tao*	*Kiao-Tsi*	*Nanchang-Kiukiang*	*Chinese-Gov't. Rlys.*
Accrued Credits to Income					
I—1 Balance, Net Operating Revenue	...	$3,990,472.48	$1,139,352.21	$137,011.27	$27,924,146.31
I—2 Income from Securities	58.50	...	208.00	...	28,553.10
I—3 Interest	513.85	109,884.50	89,260.16	2,383.46	803,562.43
I—4 Profit on Industrial Investments	...	...	...	...	...
I—5 Rents Receivable	42,442.83	21,916.80	53,567.75	17,720.41	512,628.25
I—6 Exchange, Net Credit	859.80	1,355,739.21	119,009.57	13,134.93	1,715,564.49
I—7 Miscellaneous Credits	...	8,822.23	1,224.26	7,294.42	32,442.15
Total Credit to Income	$43,874.98	$5,486,835.22	$1,402,721.95	$177,544.49	$31,016,896.73
Accrued Charges Against Income					
I—8 Balance, Net Operating Loss	914,392.41	...	...	...	1,697,550.81
I—9 Interest on Funded Debt	2,426,966.05	2,336,947.17	2,400,000.00	675,078.14	17,328,486.41
I—10 Interest on Current Debt	96,386.85	...	48,210.00	169,345.20	6,512,248.24
I—11 Contractual Dividends	...	...	...	...	...
I—12 Government Interest	...	...	...	...	517,367.95
I—13 Loss On Industrial Investments	...	...	...	...	7,083.29
I—14 Amortization of Discount on Funded Debt	92,048.88	...	...	...	599,151.41
I—15 Taxes	...	...	...	...	65,675.50
I—16 Rent Payable	...	427,130.69	...	...	1,266,977.74
I—17 Discount on Depreciated Currency	29,012.60	...	505.19	83,049.90	197,597.11
I—18 Exchange, Net Debit	9,995.22	1,747,683.45	162,283.83	27,622.96	3,073,424.70
I—19 Miscellaneous Debits	2,325.79	...	651.69	22,330.96	79,713.26
Total Debits to Income	$3,571,127.80	$4,511,761.31	$2,611,650.71	$979,376.35	$31,345,276.42
Credit (or Debit) Balances of the Year	*3,527,252.82	975,073.91	*1,208,928.76	* 801,931.86	98,253,790.31

(*) Loss or Debit Balance
(1) Under Construction

Table VIII.—Profit and Loss.

Items	*Peping-Hankow*	*Peping-Mukden*	*Tientsin-Pukow*	*Shanghai-Nanking*	*Shanghai-H.-N.*	*Peping-Suiyuan*
Credits:—						
Balance for the year	...	$7,855,251.45	...	$1,575,36[illegible].32	$1,018,393.42	...
Profit on sale of Assets	...	...	...	...	1,035.62	...
Delayed Operating Credits	$7,885.03	4,767.11	158,140.70	3,52[illegible].63	...	2,351.20
Miscellaneous Credits	201,557.19	1,097,391.84	543,279.15	...	...	41,607.44
Total	$209,442.22	$8,957,410.40	$701,419.85	$1,579,08[illegible].95	$1,019,429.04	$43,958.64
Debits:—						
Balance for the year	$1,210,129.82	...	$3,811,391.34	...	...	$2,959,745.29
Loss on Property Retired	27,911.00	438.19	...	...	40.00	...
Delayed Operating Debits	5,326.97	40,079.49	50,642.50	2,071,01[illegible].58	612,969.35	1,190.00
Miscellaneous Debits	99,273.83	883,480.06	60,600.40	47[illegible].20	...	26,954.00
Total	$1,342,641.62	$923,997.74	$3,922,634.24	$2,071,49[illegible].78	$613,009.35	$3,987,889.29
Surplus (or Deficit)	*1,133,199.40	8,033,412.66	*3,221,214.39	*492,40[illegible].83	406,419.69	*3,943,930.65

Items	*Cheng-Tai*	*Taokow Chinghua*	*Kaifeng-Honan*	*Lung Hai*	*Kirin-Changchun*	*Canton-Kowloon*
Credits:—						
Balance for the year	$2,835,761.35	...	...	...	$193,925.32	...
Profit on sale of Assets	...	...	...	...	...	...
Delayed Operating Credits	...	...	...	(1)	...	...
Miscellaneous Credits	750,000.00	5.85	...	...	616.06	4,166.67
Total	$3,585,761.35	5.85	...	...	$194,541.38	$4,166.67
Debits:—						
Balance for the year	...	$179,320.05	...	...	...	$83,547.52
Loss on Property Retired	149.86	...	...	...	...	...
Delayed Operating Debits	...	...	...	...	17.20	...
Miscellaneous Debits	...	11.14	...	...	...	84,497.80
Total	$149.86	$179,331.19	...	...	$17.20	$168,045.32
Surplus (or Deficit)	3,585,611.49	*179,325.34	...	...	194,524.18	*163,878.65

Items	*Hupeh-Hunan*	*Ssu-Tao*	*Kiao-Tsi*	*Nanchang-Kiukiang*	*Chinese Gov't. Rlys.*
Credits:—					
Balance for the year	...	$975,073.91	...	...	$14,453,767.77
Profit on sale of Assets	...	...	...	...	$1,035.62
Delayed Operating Credits	...	...	614.66	...	177,484.33
Miscellaneous Credits	132,151.24	...	32,171.84	...	2,802,947.28
Total	$132,151.24	$975,073.91	$32,786.50	...	$17,435,235.00
Debits:—					
Balance for the year	$3,527,252.82	...	$1,208,928.76	$801,831.86	$14,782,147.46
Loss on Property Retired	...	...	25,863.61	...	54,402.66
Delayed Operating Debits	6,201.51	...	864.79	...	2,788,310.39
Miscellaneous Debits	19,566.35	...	416.19	...	1,175,274.97
Total	$3,553,020.68	...	$1,236,073.35	$801,831.86	$18,800,135.48
Surplus (or Deficit)	*3,420,869.44	975,073.91	*1,203,286.85	*801,831.86	*1,364,900.48

(*) Deficit
(1) Under Construction

Table IX.—Surplus Appropriation Account

Items	*Peping-Hankow* $	*Peping-Mukden* $	*Tientsin-Pukow* $	*Shanghai-Nanking* $	*Shanghai-H.-N.* $	*Peping-Suiyuan* $
S—1 Surplus for the year	..	8,033,412.66	..	..	406,419.69	..
S—2 Surplus from Previous Years (Free)	..	44,426.16	..	*4,621,997.12	638,165.10	..
S—3 Transfer of Government Interest (Omitted)	1,133,199.40	..	..	..	..	†299,792.24
Total Credits	1,133,199.40	8,077,838.82	..	4,621,997.12	1,044,584.79	299,792.24
Deficit carried to Balance Sheet	..	..	4,076,713.17	..	644,786.33	5,330,708.38
Total	1,133,199.40	8,077,838.82	4,076,712.17	4,621,997.12	1,709,371.12	5,630,500.62
S—4 Deficit of the year	1,133,199.40	..	3,221,214.39	492,405.83	..	3,943,930.65
S—5 Deficit from Previous Years	..	..	855,498.78	..	..	..
S—6 Bondholder's share of Surplus	..	..	..	336,714.63	..	..
S—7 Appropriations for Additions to Property	..	2,769,319.47	..	208,704.85	..	(less) 27,327.91
S—8 Appropriations for Repayments of Funded Debt	..	710,952.38	..	..	..	..
S—9 Discount Extinguished through Surplus	..	..	..	..	..	..
S—10 Special Appropriations to Funds	..	..	..	..	..	..
S—11 Miscellaneous Appropriations	..	..	..	..	..	..
S—12 Special Remittance to Government (including Transfers of Military Transportation Accounts, etc.)	..	2,462,238.34	..	2,119,362.89	1,709,371.12	1,713,897.88
Total Debits	1,133,199.40	5,942,510.19	4,076,713.17	3,157,188.20	1,709,371.12	5,630,500.62
Surplus Carried to Balance Sheet	..	2,153,328.63	..	1,464,808.92	..	..
Total	1,133,199.40	8,077,838.82	4,076,713.17	4,621,997.12	1,709,371.12	5,630,500.62

*Includes $415,138.88, overstatement of bondholder's share of Surplus in accounts for 1924/5.
†Transfer from B—3—1 to Cover Losses.

TABLE IX.—SURPLUS APPROPRIATION ACCOUNT.—*(Continued)*

Items	*Cheng-Tai* $	*Taokow-Chinghua* $	*Kaifeng-Honan* $	*Lung-Hai* $	*Kirin-Changchun* $	*Canton Kowloon* $
S—1 Surplus for the year	3,585,611.49	..	*	*	194,524.18	..
S—2 Surplus from Previous Years (Free)	10,248,551.80	..	..	..	219,312.79	..
S—3 Transfer of Government Interest (Omitted)	..	..	..	..	126,717.51	..
Total Credits	13,834,163.29	..	..	..	540,554.48	..
Deficit carried to Balance Sheet	..	1,301,073.95	..	..	..	8,372,647.28
Total	13,834,163.29	1,301,073.95	..	..	540,554.48	8,372,647.28
S—4 Deficit of the year	..	179,325.34	..	..	..	163,878.65
S—5 Deficit from Previous Years	..	1,121,748.61	..	..	..	8,208,768.63
S—6 Bondholder's share of Surplus	..	..	..	..	86,701.48	..
S—7 Appropriations for Additions to Property	671,671.73	..	..	..	312,652.85	..
S—8 Appropriations for Repayments of Funded Debt	950,000.00	..	..	..	..	..
S—9 Discount Extinguished through Surplus	..	..	..	..	..	..
S—10 Special Appropriations to Funds	..	..	..	..	..	..
S—11 Miscellaneous Appropriations	..	..	..	..	..	..
S—12 Special Remittance to Government (including Transfers of Military Transportation Accounts, etc.)	..	..	..	..	40,155.00	..
Total Debits	1,621,671.73	1,301,073.95	..	..	439,509.33	8,372,647.28
Surplus Carried to Balance Sheet	12,212,491.56	..	..	..	101,045.15	..
Total	13,834,163.29	1,301,073.95	..	..	540,554.48	8,372,647.28

Items	*Hupeh-Hunan* $	*Ssu-Tao* $	*Kiao-Tsi* $	*Nanchang-Kinkiang* $	*Chinese Govt. Rlys.* $
S—1 Surplus for the year	..	975,073.91	..	..	13,195,041.93
S—2 Surplus from Previous Years (Free)	..	..	326,668.64	..	16,099,121.61
S—3 Transfer of Government Interest (Omitted)	..	..	..	..	1,559,709.15
Total Credits	..	975,073.91	326,668.64	..	30,853,872.69
Deficit carried to Balance Sheet	13,330,168.32	..	867,618.21	6,574,665.96	40,527,381.60
Total	13,330,168.32	975,073.91	1,203,286.85	6,574,665.96	71,381,254.29
S—4 Deficit of the year	3,420,869.44	..	1,203,286.85	801,831.86	14,559,942.41
S—5 Deficit from Previous Years	9,909,298.88	395,858.24	..	5,772,834.10	26,264,007.24
S—6 Bondholder's Share of Surplus	..	..	..	..	423,416.11
S—7 Appropriations for Additions to Property	..	579,215.67	..	..	4,514,236.66
S—8 Appropriations for Repayments of Funded Debt	..	..	..	..	1,660,952.38
S—9 Discount Extinguished through Surplus	..	..	..	..	..
S—10 Special Appropriations to Funds	..	..	..	..	..
S—11 Miscellaneous Appropriations	..	..	..	..	..
S—12 Special Remittance to Government (including Transfers of Military Transportation Accounts, etc.)	..	..	..	..	8,045,025.23
Total Debits	13,330,168.32	975,073.91	1,203,286.85	6,574,665.96	55,467,580.03
Surplus Carried to Balance Sheet	..	..	..	..	15,913,674.26
Total	13,330,168.32	975,073.91	1,203,286.85	6,574,665.96	71,381,254.29

TABLE X was not provided by the Ministry of Railways

TABLE XI-A.—LIABILITIES OR CREDIT BALANCES (DETAILED BALANCE SHEET)

Heads of Classification	*Peping-Hankow* $	*Peping-Mukden* $	*Tientsin-Pukow* $	*Shanghai-Nanking* $	*Shanghai-H.-N.* $	*Peping-Suiyuan* $
B—1 Capital Liabilities :—						
B—1—1 Shares	..	..	..	..	..	..
B—1—2 Premium on Shares	..	..	..	..	..	..
B—1—3 Permanent Government Investments	40,369,381.17	23,903,392.57	4,424,824.00	5,686,900.47	17,657,509.75	22,662,737.06
B—1—4 Mortgage Bonds	34,881,679.45	12,440,952.41	74,865,575.65	28,178,309.16	9,792,352.03	..
B—1—5 Other Secured Indebtedness	7,233,298.23	..	9,287,662.21	..	1,374,806.67	7,519,856.69
Total Capital Liabilities	82,484,358.85	36,344,344.98	88,578,061.86	33,865,209.63	28,824,668.45	30,182,593.75
B—2 Working Liabilities :—						
B—2—1 Loans and Bills of Exchange	15,443,830.18	5,506,513.81	5,036,340.30	..	..	11,043,890.48
B—2—2 Traffic Balances Payable						
B—2—2—1 Government Railways	63,834.15	231,178.23	1,174,045.24	56,005.00	20,334.77	1,027,369.09
B—2—2—2 Private Companies	143,641.62	..	..	6,017.99	1,256.50	..
B—2—3 Matured Liabilities Unpaid	9,410,531.71	403,752.41	1,418,268.03	693,578.36	386,699.47	2,470,091.17
B—2—4 Other Accounts Payable						
B—2—4—1 Other Railways	5,274.09	868,860.42	..	28.19	121,878.81	..
B—2—4—2 Sundry Creditors	6,936,259.00	8,340,498.53	7,846,206.40	888,277.71	5,123.25	20,696,684.34
Total Working Liabilities	32,003,370.75	15,410,803.40	15,474,859.97	1,643,907.25	535,292.80	36,138,035.08
B—3 Deferred Credit Items :—						
B—3—1 Temporary Advance from Government	..	..	..	174,482.78	..	..
B—3—2 Operating Reserves	..	..	..	..	..	..
B—3—3 Depreciation Reserves	16,329,002.84	10,874,098.16	6,409,787.53	1,968,149.13	1,527,105.31	4,824,274.40
B—3—4 Liabilities on Account of Provident Funds	..	..	..	..	..	..
B—3—5 Miscellaneous Deferred Credits	4,938,723.14	17,677.34	24,874,021.46	348,020.89	166,767.41	8,013,013.49
Total Deferred Credits	21,267,725.98	10,891,775.50	31,283,808.99	2,490,652.80	1,693,872.72	12,837,287.89

*Under Construction.

TABLE XI.-A.—LIABILITIES OR CREDIT BALANCES (DETAILED BALANCE SHEET).—*(Continued)*

Heads of Classification	*Peping-Hankow*	*Peping-Mukden*	*Tientsin-Pukow*	*Shanghai-Nanking*	*Shanghai-H.-N.*	*Peping-Suiyang*
	$	$	$	$	$	$
B—4 Balance Accumulated Surplus :—						
B—4—1 Additions to Property through Surplus ..	29,104,487.38	51,960,560.20	14,856,359.03	633,678.77	315,417.82	1,011,636.31
B—4—2 Funded Debt Retired through Surplus ..	21,786,107.73	16,894,193.36	11,906,920.64	262,975.27	..	1,892,570.00
B—4—3 Fund Reserves	..	..	..	..	..	..
B—4—4 Free Surplus	..	2,135,328.63	..	1,464,808.02	..	..
Total Accumulated Surplus	50,890,595.11	70,990,082.19	26,763,279.67	2,361,462.96	315,417.82	8,904,206.31
Grand Total	186,646,050.69	133,637,006.07	162,100,010.49	40,361,232.54	31,369,251.79	88,062,123.03

Heads of Classification	*Cheng-Tai*	*Taokow-Chinghua*	*Kaifeng-Honan*	*Lung-Hai*	*Kirin-Changchun*	*Canton Kowloon*
	$	$	$	$	$	$
B—1 Capital Liabilities :—						
B—1—1 Shares	..	..	..	..	813,100.00	..
B—1—2 Premium on Shares	..	..	..	..	..	..
B—1—3 Permanent Government Investments ..	6,331,705.63	4,303,911.87	..	*	421,863.25	3,096,157.58
B—1—4 Mortgage Bonds	6,788,541.66	4,724,733.86	..	..	5,889,016.37	12,226,600.00
B—1—5 Other Secured Indebtedness	..	323,627.37	..	..	..	..
Total Capital Liabilities	13,120,247.29	9,352,273.10	..	..	7,123,979.62	15,322,757.58
B—2 Working Liabilities :—						
B—2—1 Loans and Bills of Exchange	..	..	..	..	..	..
B—2—2 Traffic Balances Payable						
B—2—2—1 Government Railways	37,697.28	291,414.86	..	..	14,847.65	..
B—2—2—2 Private Companies	..	..	..	..	30,074.19	..
B—2—3 Matured Liabilities Unpaid	121,627.54	395,608.41	..	..	236,457.86	93,073.92
B—2—4 Other Accounts Payable :						
B—2—4—1 Other Railways	5,409.80	..	..	..	..	..
B—2—4—2 Sundry Creditors	23,007.67	987.17	..	..	637,997.41	1,126,406.40
Total Working Liabilities	187,742.29	688,010.44	..	..	919,377.11	1,219,480.32
B—3 Deferred Credit Items :—						
B—3—1 Temporary Advance from Government ..	3,570,389.33	1,237,353.31	..	..	..	8,994,831.65
B—3—2 Operating Reserves	..	..	..	..	..	..
B—3—3 Depreciation Reserves	1,835,992.33	781,229.07	..	..	516,184.95	585,069.17
B—3—4 Liabilities on Account of Provident Funds..	..	..	..	..	563.97	..
B—3—5 Miscellaneous Deferred Credits	18,428.29	66,228.88	..	..	62,971.56	18,803.14
Total Deferred Credits	5,524,809.95	2,084,811.26	..	..	579,720.48	9,598,703.96
B—4 Balance Accumulated Surplus :—						
B—4—1 Additions to Property Through Surplus ..	4,605,180.60	..	..	..	2,444,969.57	..
B—4—2 Funded Debt Retired through Surplus ..	7,819,928.43	..	..	..	..	..
B—4—3 Fund	..	..	..	..	..	..
B—4—4 Free Surplus	12,212,491.56	..	..	..	101,045.15	..
Total Accumulated Surplus	24,637,600.59	..	..	..	2,546,014.72	..
Grand Total	43,470,400.12	12,125,094.80	..	..	11,169,091.93	26,140,841.86

Heads of Classification	*Hupeh-Hunan*	*Ssu-Tao*	*Kiao-Tsi*	*Nanchang-Kiukiang*	*Chinese Govt. Rlys.*
	$	$	$	$	$
B—1 Capital Liabilities :—					
B—1—1 Shares	..	..	..	6,306,952.66	7,120,052.66
B—1—2 Premium on Shares	..	..	..	..	..
B—1—3 Permanent Government Investments	3,386,791.64	426,187.50	..	..	32,671,362.49
B—1—4 Mortgage Bonds	51,398,065.79	29,765,384.62	..	10,243,416.56	81,194,527.56
B—1—5 Other Secured Indebtedness	..	..	40,000,000 00	..	65,739,251.17
Total Capital Liabilities	54,784,857.43	30,191,572.12	40,000,000 00	16,550,369.22	486,725,193.88
B—2 Working Liabilities :—					
B—1—1 Loans and Bills of Exchange	..	..	..	2,819,695.69	39,910,270.46
B—2—2 Traffic Balances Payable					
B—2—2—1 Government Railways	..	8,090.96	32,708.54	..	3,857,525.77
B—2—2—2 Private Companies	..	26,914.19	131,343.14	..	339,247.63
B—2—3 Matured Liabilities Unpaid	2,053,341.80	5,040,415.95	2,508,263 14	63,955.55	25,295,665.32
B—2—4 Other Accounts Payable					
B—2—4—1 Other Railways	..	..	..	..	1,001,451.31
B—2—4—2 Sundry Creditors	..	739.14	2,387,381 65	456,003.45	49,345,572.12
Total Working Liabilities	2,053,341.80	5,076,160.24	5,059,696 47	3,339,654.69	119,749,732.61
B—3 Deferred Credit Items :—					
B—3—1 Temporary Advance from Government	16,205,934.49	..	..	..	30,282,991.56
B—3—2 Operating Reserves	..	..	..	..	..
B—3—3 Depreciation Reserves	1,289,926.87	..	2,131,862 47	278,810.43	49,351,492.66
B—3—4 Liabilities on Account of Provident Funds	..	4,152.59	..	..	4,716.56
B—3—5 Miscellaneous Deferred Credits	6,863,458.75	79,023.82	186,544 39	219,594.35	45,873,276.91
Total Deferred Credits	24,359,320.11	83,176.41	2,318,406 86	498,404.78	125,512,477.69
B—4 Balance Accumulated Surplus :—					
B—4—1 Additions to Property through Surplus	..	579,215.67	3,009,048 26	..	14,520,553.61
B—4—2 Funded Debt Retired through Surplus	..	..	..	..	60,562,695.43
B—4—3 Fund Reserves	..	..	..	..	..
B—4—4 Free Surplus	..	..	..	..	15,913,674.26
Total Accumulated Surplus	..	579,215.67	3,009,048 26	..	90,996,923.30
Grand Total	81,197,519.34	35,930,124.44	50,387,151 59	20,388,428.69	822,984,327.48

*Under Construction

TABLE XI.-B.—DETAILED BALANCE SHEET—ASSETS OR DEBIT BALANCES.

Heads of Classification	*Peping-Hankow*	*Peping-Mukden*	*Tientsin-Pukow*	*Shanghai-Nanking*	*Shanghai-H.-N.*	*Peping-Suiyuan*
B—5 Investment Assets	$	$	$	$	$	$
B—5—1 Cost of Road and Equipment	123,634,611.81	106,069,811.25	120,118,576.47	33,581,904.12	24,502,078.43	57,902,324.42
B—5—2 Cost of Other Physical Property	484,151.71	467,730.61	123,770.30	...	3,144,304.66	...
B—5—3 Cost of Non-physical Assets	1,225,350.43	807,002.80	17,788.24	10,578.65	...	76,099.00
Total Investment Assets	125,344,113.95	107,344,544.66	120,260,135.01	33,592,482.77	27,646,383.09	57,978,423.42
B—6 Working Assets	$	$	$	$	$	$
B—6—1 Cash	3,933,709.15	1,607,739.39	825,336.53	842,720.95	127,996.68	988,931.48
B—6—2 Loans and Bill of Exchange	65,000.00	...	...	...	...	...
B—6—3 Traffic Balance Receivable	...	...	...	...	...	...
B—6—3—1 Government Railways	1,934,266.08	...	227,665.27	327.08	433.95	1,644,250.14
B—6—3—2 Private Companies	...	...	...	...	1,439.09	15,464.43
B—6—3—3 Home Line	1,629,497.75	1,366,349.95	531,558.93	130,994.18	76,459.59	368,276.40
B—6—4 Other Accounts Receivable	...	...	...	...	...	...
B—6—4—1 Other Railways	...	50,600.70	...	112,586.03	2,423.30	...
B—6—4—2 Sundry Debits	119,748.21	1,185,546.44	23,074.49	303,589.22	177,968.77	338,812.35
B—6—5 Stores	8,450,798.80	5,246,972.28	5,411,391.64	1,508,738.82	1,283,016.58	1,606,756.72
Total Working Assets	16,193,019.99	9,457,209.28	7,019,026.86	2,898,956.28	1,669,737.96	4,962,491.52
B—7 Deferred Debit Items	$	$	$	$	$	$
B—7—1 Temporary Advances to Government	18,776,756.55	...	23,213,869.13	...	4,687.81	472,620.89
B—7—2 Payments made in advance	209,915.31	...	153,684.28	...	689,719.14	920,680.59
B—7—3 Unextinguished Discount on Funded Debt	2,004,919.46	1,366,200.00	216,475.97	1,314,618.61	685,467.52	...
B—7—4 Abandoned Property Not Charged Off	18,000.00	...	...	...	...	...
B—7—5 Special Funds	7,391,007.87	2,482,257.40	452,500.41	180,000.00	...	448,613.00
B—7—6 Miscellaneous Deferred Debits	16,708,227.56	12,986,794.73	6,707,605.66	2,375,174.98	8,469.94	17,948,585.23
Total Deferred Debits	45,108,916.75	16,835,252.13	30,744,135.45	3,869,793.59	1,388,344.41	19,790,499.71
B—8 Balance, or Accumulated Deficit	...	...	4,076,713.17	...	664,786.33	5,330,708.38
Grand Total	186,646,050.69	133,637,006.07	162,100,110.49	40,361,232.64	31,369,251.79	88,062,123.03

Heads of Classification	*Cheng-Tai*	*Taokow-Chinghua*	*Kaifeng-Honan*	*Lung-Hai*	*Kirin-Changchun*	*Canton Kowloon*
B—5 Investment Assets	$	$	$	$	$	$
B—5—1 Cost of Road and Equipment	25,936,886.23	8,355,071.94	...	(1)	8,976,654.38	15,885,199.27
B—5—2 Cost of Other Physical Property	...	...	...	...	24,387.08	...
B—5—3 Cost of Non-physical Assets	...	...	...	...	40,670.00	...
Total Investment Assets	25,936,886.23	8,355,071.94	...	...	9,041,711.46	15,885,199.27
B—6 Working Assets	$	$	$	$	$	$
B—6—1 Cash	2,423,742.19	177,506.87	...	...	275,988.39	162,600.96
B—6—2 Loans and Bill of Exchange	...	...	...	...	...	...
B—6—3 Traffic Balance Receivable	...	...	...	...	...	...
B—6—3—1 Government Railways	78,198.05	440,775.25	...	...	4,277.60	...
B—6—3—2 Private Companies	...	...	...	...	6,702.82	24,958.30
B—6—3—3 Home Line	89,941.89	409,010.02	...	...	134,950.02	6,675.54
B—6—4 Other Accounts Receivable	...	...	...	...	...	...
B—6—4—1 Other Railways	38,889.58	...	...	...	...	...
B—6—4—2 Sundry Debits	16,495.78	200,347.19	...	...	184,579.54	2,102.49
B—6—5 Stores	2,444,106.54	200,366.88	...	...	476,254.09	290,964.88
Total Working Assets	5,091,374.03	1,428,006.21	...	...	1,082,752.46	487,303.17
B—7 Deferred Debit Items	$	$	$	$	$	$
B—7—1 Temporary Advances to Government	10,240,931.20	...	...	...	113,924.04	902,393.81
B—7—2 Payments made in advance	251,812.16	...	...	...	425,245.94	...
B—7—3 Unextinguished Discount on Funded Debt	678,854.18	14,481.07	...	...	319,945.53	330,000.00
B—7—4 Abandoned Property Not Charged Off	...	...	...	...	...	...
B—7—5 Special Funds	...	32,698.66	...	...	...	...
B—7—6 Miscellaneous Deferred Debits	1,270,542.32	993,762.97	...	...	185,512.50	163,298.33
Total Deferred Debits	12,442,139.86	1,040,942.70	...	...	1,044,628.01	1,395,692.14
B—8 Balance, or Accumulated Deficit	...	1,301,073.95	...	...	...	8,372,647.28
Grand Total	43,470,400.12	12,125,094.80	...	...	11,169,091.93	26,140,841.86

Heads of Classification	*Hupeh-Hunan*	*Ssu-Tao*	*Kiao-Tsi*	*Nanchang-Kiukiang*	*Chinese Gov't. Rlys.*
B—5 Investment Assets	$	$	$	$	$
B—5—1 Cost of Road and Equipment	59,340,071.94	20,330,614.89	39,054,239.35	11,891,535.41	655,579,579.91
B—5—2 Cost of Other Physical Property	...	...	...	...	4,244,344.36
B—5—3 Cost of Non-physical Assets	50,500.00	...	2,300.00	...	2,230,289.12
Total Investment Assets	59,390,571.94	20,330,614.89	39,056,539.35	11,891,535.41	662,054,213.39
B—6 Working	$	$	$	$	$
B—6—1 Cash	508.70	3,447,135.17	1,894,301.97	55,298.87	16,823,517.30
B—6—2 Loans and Bill of Exchange	...	...	...	...	88,902.50
B—6—3 Traffic Balance Receivable	...	...	...	...	...
B—6—3—1 Government Railways	55,645.80	...	102,370.56	...	4,488,209.78

(1) Under Construction

TABLE XI.-B.—DETAILED BALANCE SHEET—ASSETS OR DEBIT BALANCES.—*(Continued)*

Head of Classification	*Hupeh-Hunan*	*Ssu Tao*	*Kiao Ts*	*Nanchang Kiukiang*	*Chinese Gov't. Rlys.*
	$	$	$	$	$
B—6—3—2 Private Companies	...	678,980.95	431.30	...	727,976.89
B—6—3—3 Home Line	91,245.79	111,600.25	2,132,340.71	6,512.47	7,085,414.49
B—6—4 Other Accounts Receivable	...	...	...	...	...
B—6—4—1 Over Railways	43,241.19	...	395,197.25	1,152.00	644,090.05
B—6—4—2 Sundry Debits	66,201.22	97,383.98	789,983.41	356,857.08	3,862,690.17
B—6—5 Stores	1,186,392.15	1,500,332.16	3,297,884.22	282,408.74	33,186,385.02
Total Working Assets	1,443,234.85	5,835,432.51	8,612,400.42	726,131.66	66,907,186.20
B—7 Deferred Debit Items	$	$	$	$	$
B—7—1 Temporary Advances to Government...	...	8,838,975.80	167,021.83	...	62,731,181.06
B—7—2 Payments made in advance	46,432.72	126,247.02	66,020.22	270,867.72	3,160,625.10
B—7—3 Unextinguished Discount on Funded Debt	2,255,197.56	787,750.00	...	494,231.93	10,468,141.83
B—7—4 Abandoned Property Not Charged Off	...	...	...	...	18,000.00
B—7—5 Special Funds	18,900.00	...	...	...	11,006,067.34
B—7—6 Miscellaneous Deferred Debits	4,713,013.95	11,104.22	1,608,442.56	430,996.01	66,111,530.96
Total Deferred Debits	7,033,544.23	9,764,077.04	1,841,484.61	1,196,095.66	53,495,546.29
B—8 Balance, or Accumulated Deficit	13,330,168.32	...	876,618.21	6,574,665.96	40,527,381.60
Grand Total	81,197,519.34	35,930,124.44	50,387,151.59	20,388,428.69	822,984,327.48

An analysis of the tables, which were so kindly prepared for us by the Ministry of Railways, clearly shows the possibilities of the Chinese Government Railways under expert and unified administration. The difficulty in the past has been that militarists have not only seized the rolling stock of the lines but also their revenues with which they have financed themselves. Freight cars were detained and sold to the highest bidders, while favored transportation companies were permitted to operate without settling their accounts. Mr. Sun Fo has valiantly fought for a demilitarization of the Chinese Government Railways and has at last succeeded in effecting a central administrative control.

According to Minister Sun, the two most serious problems which confronted the Railway Authorities in the past have been, firstly, the heavy financial burdens of the various Railways in meeting the demands of the Military authorities which robbed the various Administrations of practically all of their revenue; and secondly, the exorbitant miscellaneous levies imposed by the Military authorities upon all freight transported by the Railways which considerably reduced the income from freight transportation.

These two main obstacles to the development of the Railways, however, are being removed by the Central Authorities, and coupled with the centralization of control of all Government Railways, there is good hope that the various Lines will soon be efficiently and profitably maintained. The Ministry is likewise planning to effect repairs to the permanent way and to purchase new rolling stock and other equipment to meet the needs of the various Lines.

He is now engaged in effecting a reorganization of the administration of the railways, particularly as regards the purchasing departments, but he is also planning to liquidate the frozen merchant credits of the various lines. Only by such means will China's credit be restored and sufficient confidence be engendered to make possible the financing of the necessary rehabilitation and constructional plans of the Ministry.

A new chapter in the Government's Railway administration may be said to have been written with the announcement of the coming into force of the Regulations governing the organization of the State Railway Administrations under the Ministry of Railways. The authorities hope that the innovations in the administration of the Government's Railways will not only increase the efficiency of the various Railway Administrations in due course and gradually centralize the control thereof, but also that the various Lines will soon yield sufficient profit to defray their outstanding indebtedness as well as providing for improvements and extensions.

Following is a translation of the new Regulations governing the various State Railway Administrations under the Ministry of Railways :—

Article 1.—All Government Railways shall each be under an Administration in the direct control of the Ministry of Railways; the names of such Administrations and the various Lines under their respective jurisdiction to be separately regulated.

Article 2.—Each Railway Administration shall be in charge of the traffic, repairs, maintenance, operation, accounting and other related affairs of the whole Line; and shall also be responsible for the extension or construction of new branch lines which are to be placed under its control.

Article 3.—The Railway Administrations shall be classified into first, second and third grades according to the length of the Lines and the volume of business; the classification and the number of staff-members to be separately determined.

Article 4.—Each Railway Administration shall have the following departments to take separate charge of the affairs enumerated in Art. 2 :—

(*a*) General Affairs Department.
(*b*) Engineering Department.
(*c*) Traffic Department.
(*d*) Locomotives Department.
(*e*) Accounting Department.
(*f*) Supplies Purchasing Department.

The above-mentioned various Departments may be amalgamated with one another or placed in concurrent charge of the officers of the Administration concerned according to the varying conditions of the Lines.

Whenever necessary, the Administration may establish, upon approval by the Ministry of Railways, branch offices at the more important points along the Line.

Article 5.—Each Railway Administration shall have the following officers :—

(*a*) Managing-Director.
(*b*) Assistant Managing Director.
(*c*) Departmental Directors (Managers) and Assistant Departmental Directors (Assistant Managers).
(*d*) Chief Engineer and Assistant Chief Engineers.
(*e*) Chief Inspectors.
(*f*) Chief Auditors.
(*g*) Assistants (in the various Departments).
(*h*) Secretaries.
(*i*) Sectional Chiefs.
(*j*) Section Managers.
(*k*) Assistant Section Managers
(*l*) Superintendent of machine shops and works.
(*m*) Director of Railway Hospitals.
(*n*) Sub-Section Superintendents and Assistant Sub-Section Superintendents.
(*o*) Branch Office Managers.
(*p*) Assistant Branch Office Managers.
(*q*) Staff members.
(*r*) Station masters and Assistant Station Masters.
(*s*) Chief Conductors of Trains.
(*t*) Engineers.
(*u*) Technical staff members.

The above-mentioned officers of a Railway Administration may be appointed according to the need of the Line concerned.

For all First-Class Railway Administrations, the Ministry of Railway shall appoint an Assistant Managing Director, a number of Assistant Departmental Directors and Assistant Sectional Chiefs according to the volume of business transacted by the Administration concerned.

For all Second-Class Administrations the Ministry of Railways shall appoint an Assistant Managing Director and a number of Assistant Departmental Directors.

No officials other than those mentioned in the first paragraph of this Article shall be appointed unless with previous special approval from the Ministry of Railways.

Article 6.—The Managing Director of a Railway Administration shall be appointed by the Minister of Railways to manage and administer under the latter's direction all affairs of the entire Line and direct and supervise all subordinate officials.

Article 7.—The Assistant Managing Directors shall be appointed by the Minister of Railways to assist the Managing Directors in administering the affairs of the Line.

Article 8.—The Departmental Directors, Assistant Departmental Directors, Chief Engineer, Assistant Chief Engineers, Chief Inspectors, Chief Auditors, Assistants, Sectional Chiefs, Superintendents of Locomotive Plants, Superintendents of Supplies Stores and the Section Managers of a Railway Administration shall all be appointed by the Minister of Railways to take, under the direction of their respective superior officers, separate charge of the affairs falling under their respective jurisdiction.

Article 9.—The Secretaries of a Railway Administration shall be appointed by the Minister of Railways upon recommendation by the Managing Director concerned to take charge of confidential matters under the direction of their superior officers.

Article 10.—The Sub-Section Engineers, Assistant Sub-Section Engineers, Engineers, Directors of Hospitals, Superintendents of Machine Shops and Works, Managers of Branch Offices, Assistant Sectional Chiefs, Sectional staff members, Technical staff members, Station Masters, Assistant Station Masters and the Chief Conductors of Trains of a Railway Administration shall be all appointed by the Managing Director thereof upon approval and confirmation by the Ministry of Railways to take separate charge of the affairs falling under their respective jurisdiction.

Article 11.—A Railway Administration may employ a number of employees and clerks.

Article 12.—The Regulations Governing the Organization of a particular Railway Administration, the Rules Governing the Administrative Jurisdiction and Powers of the Railway Officials, the Regulations Determining the Official grades and Salary Schedule of all Railway Officers and the Regulations Governing Employment of other Railway Employees and clerks shall all be separately determined.

Article 13.—Unless otherwise specified in other laws, regulations, orders, contracts or agreements, the management of all Government Railways shall conform to the present regulations.

Article 14.—These General Regulations shall become effective on the day of promulgation.

The Engineer as Peacemaker

(Continued from page 435).

The classification of the foreign delegates to the conference and congress in Tokyo is as follows:

Name of Nation	*Num. delegates*	*Guests*
Argentina	1	0
Austria	1	1
Australia	3	3
Burma	1	3
Brazil	1	0
Canada	4	0
China	51	1
Czechoslovakia	3	1
Denmark	9	4
Finland	1	0
France	8	0
Germany	38	12
Britain	35	10
Italy	3	2
Netherland Indies	3	3
Poland	1	0
Philippines	6	1
Straits Settlements	2	0
Sweden	9	5
Russia	9	0
U.S.A.	131	100
Total	311	146
Grand total		457

These are tentative figures, which may be altered by the later report to be made at the opening of the conference.

Book Notes

Pacific Cables and Radio

International Aspects of Electrical Communications in the Pacific Area. By Leslie Bennett Tribolet, Ph.D. Baltimore: The Johns Hopkins Press, 1929.

Cables and radio on the Pacific is an exceedingly important subject, because of the tremendous distances traversed, the high cost of business, the political questions involved and the limitations to profitable operations. The peculiar conditions prevailing in China have, in particular, complicated the procedure and character of this problem.

Dr. Tribolet's book is the most important contribution to this subject. He has brought together all the facts, which he has thoroughly documented. From this standpoint his book is of the utmost importance.

Dr. Tribolet, however, spoils his very fine work by the insertion of extraneous material of doubtful value. For instance, a sentence like this: "But more and more, nations are discovering that propaganda rules the world." What nonsense! What very harmful nonsense! During the war leaders of many countries were seriously affected by the aberration that propaganda could accomplish anything. Since then decent publicists have been fighting this conception, because propaganda has become such a thing of evil, particularly as regards the use of radio for propaganda purposes. President Hoover's repudiation of propagandists in Washington will undoubtedly put a quietus to such a conception of the use of electrical communications for the purveyance of views.

Now, as regards the situation in China, Dr. Tribolet suffers from the very usual and trite suspicions that everything that is done by British or Japanese firms has some hidden, sinister motive. Everything done by Americans is done for business reasons only. The British and Japanese are imperialistic; the Americans never have imperialistic ideas. Thus, the relations of the Great Northern Telegraph Company, the Eastern Extension and the Commercial Pacific have nothing to do with business, with profit-making, but they involve only sinister politics. This type of thinking spoils an otherwise good book, just as the personal reactions of a representative of the Radio Corporation of America—who, I believe, Dr. Tribolet says, had two chins, makes one weep. Why drag it in? Also why drag in (on page 144-145) the rather feeble United Press account of Marshal Chang Tso-lin's attitude toward the South Manchuria Loan? There seems to be something of a *nonsequeter* there. When Dr. Tribolet deals with his subject, he is important and interesting, but when he wanders far afield, he weakens shamefully. He should have been advised by his publisher to omit the useless anecdotes.

In spite of these occasional slips, these Pekin Hotel anecdotes, Dr. Tribolet's volume cannot be disregarded by any student of current politics in Asia.—G.E.S.

Elesco Superheater

An interesting catalogue has reached us entitled: The Elesco Multiple-Loop, Single-Pass Superheater. The introduction reads:

> Outstanding in recent progress in superheater design is the multiple-loop, single-pass arrangement—an exclusive Elesco development—which provides greater uniformity and the higher superheat demanded by modern practice.
>
> In its application its unusual flexibility permits location within the boiler setting to best advantage. For the highest superheats, the units often are within the hottest gas zones. Ample protection is always provided through location of those units which are exposed to the severest heat, between or otherwise close to water tubes.
>
> In Elesco superheaters for H.R.T. boilers and Elesco radiant superheaters it has been found that sufficient superheat may be obtained with single-loop, single-pass superheaters. Otherwise all Elesco superheaters follow the same general Elesco principles.
>
> Typical adaptations to all types of boilers are shown herein.

Copies of this Bulletin, T-19, may be obtained from the Superheater Company, 17 East 42nd Street, New York.

(Continued on page 466).

Engineering Notes

ELECTRIC LIGHT, POWER AND TRACTION

HIDA DENTO K.K., Hida Electric Light Co., Ltd.—At the end of August, an application of the Hida Dento K.K. to construct a power station on the Gongenya River of the Jintsu River System in Gifu Prefecture was granted.

The company is now inviting contractors and makers, to bid for construction of this power station.

The capacity of this power station is 1,200 k.w., effective head 620 shaku, water quantity 30 cubit feet; the estimate cost of construction is Y.450,000.

HIROSHIMA DENKI K.K. (Hiroshima Electric Co., Ltd.) Hiroshima Denki K.K. is inviting estimates for all automatic equipment at the Kawahira Power Station, capacity 2,000 k.w. It is reported that the company will probably use Escher Wyss Turbines.

MILLION VOLT TESTING ROOMS.—The Osaka Porcelain Co. (Osaka Togyo K.K.) have partly completed its super high tension testing room (normal 700 kv and maximum 800 kv). The apparatus consist of three units of 350 kv testing transformers which will be connected in cascade to step up the voltage to 1,050 kv to earth, of which two units were completed in March as the first section of the work.

The Japan Insulator Company (Nippon Gaishi K.K.) are also contemplating the construction of a million volt testing room, the apparatus being manufactured by the Shibaura Engineering Works at present and is expected to be completed this fall.

RAILWAYS

LUNGHAI RAILWAY.—Preparations for commencing the construction of the last section of the Lunghai Railway, connecting Tungkwan with Sianfu are under way, it is learned to-day. The Chief Belgian Engineer of the Line has already proceeded to Tungkwan to supervise the surveying of the territory to be traversed by the extension.—*Kuo Min.*

FIRST SUSPENDED ELECTRIC CAR.—The Japan Suspended Electric Railway Co., who are to construct Japan's first suspended electric railway for a distance of about 1 kilometer between Katase and Enoshima, Kanagawa Prefecture, decided that the company should be capitalized at Y.500,000. Mr. Tatsusawa was elected president. The construction work will be commenced very shortly, and the line will be opened early next year with eight cars including one freight car.

JAPANESE GOVERNMENT RAILWAYS NEW DE LUXE CARS.—According to announcements made in the Japanese press, a number of new railway coaches are now under construction for the use of travelers in Japan. Some of these are expected to be placed in service before the end of this year. As an experiment they are being decorated in purely Japanese style, an innovation which is being watched with considerable interest. Some of these have the walls covered with magnificent Japanese silk brocades after the designs in the Momoyama Palace. These are to give "foreign" travelers an idea of proper Japanese interior decoration. Others are finished in the style of the latest American railway cars. These are for the information and edification of Japanese passengers. All the new cars are to be the latest steel construction.

NEW SINGAPORE RAILWAY.—Plans for a new railway to be constructed on Singapore Island, known as the "deviation scheme" have been approved by the Government of the Federated Malay States, according to a report from Trade Commissioner Don C. Bliss, Singapore. The work, which will extend over a period of approximately 2½ years, will, when completed, afford the city of Singapore 9¼ miles of additional railroad with provision for eventual double tracking; two new passenger stations, overhead bridges, and a terminal at the docks. The scheme has been prepared by the Construction Department of the Federated Malay States Railways, Singapore, which will execute the work partly on contract.

SMOKELESS LOCOMOTIVE—One of the fleet of Diesel locomotives, the first one of its kind in Japan, ordered from Germany by the Railway Office, was successfully tested between Osaka and Takatori, western suburbs of Kobe on the Tokaido line of the Government Railways.

The locomotive weighs 60 tons, develops 600 horsepower and is capable of pulling 12 steel passenger coaches of the kind now operated by the Government Railways. The test, made on an up-grade of .03 per cent. showed that it could easily average 25 miles an hour, with a capacity load.

One distinct feature of this Diesel locomotive is that it emits neither smoke nor soot, so very disagreeable in congested districts. Since no steam has to be generated, the engine carries neither a tender nor a coal bunker, and consequently the engine can go either backward or forward, without necessitating tedious switching.

Like turbo-generators aboard the latest steamers, the motive power of this locomotive is furnished by electricity, generated by the internal combustion engine directly coupled to a dynamo. The fleet of these locomotives are to run on the Kobe harbor line where smoke and soot ejected from steam engines frequently gives rise to considerable complaint from the inhabitants.

THE TUNHUA-LAOTAOKOU RAILWAY.—The Tunhua and Laotaokou in East Manchuria is a liaison between the Kirin-Tunhua Railway and the Tumen Decauville Railway, thus completing another Japanese-operated trunkline in Manchuria besides the South Manchuria Railway and the Antung-Mukden Railway.

The object of this new trunkline is to develop the port of Seishin in North Korea, which will give Japan the fourth outlet to the sea on the mainland of Asia. These outlets are Dairen on the tip of South Manchuria, which controls 80 per cent. of the beans and bean oil trade of Manchuria, Antung, a Chinese city under Japanese influence on the Chinese-Korean border, which caters to the entire lumber trade of the Yalu River, Fusan in South Korea, the leading port in that country, and the proposed port of Seishin, which though situated in Korean territory will monopolize the lumber trade of the Tumen River and the export of Chinese agricultural products in that part of Manchuria. All these four trade ports will soon be connected by a huge Japanese railway system, when the 105 kilometers of rail between Tunhua and Laotaokou is laid. This huge railway system of Japan includes the South Manchuria Railway, measuring 902 kilometers, which runs from Dairen to Changchun, the Antung-Mukden Railway of 263 kilometers in length, Korean Railways, measuring 1,750 kilometers in all, consisting of four railways radiating from Seoul, and the contemplated Kirin-Seishin trunkline, consisting of 170 kilometers of the Kirin-Changchun Line, 210 kilometers of the Kirin-Tunhua Line, 105 kilometers of break distance between Tunhua and Laotaokou, 101 kilometers of the Tienpaoshan-Tumen Light Decauville Railway, 43 kilometers of the Tumen Line, and 94 kilometers of the Kwainei-Seishin Line. As soon as the break between Tunhua and Laotaokou is bridged by a standard gauge railway, the Tumen-Decauville Railway will be so standardized, that through traffic can be maintained between Seishin and Kirin.

RAILWAY PLANS FOR CENTRAL SUMATRA.—For central Sumatra a longitudinal network has been designed, in which Pranap, and later Talork, will be connected as navigable terminals of the Indragiri River, with Moeara Boengo, the navigable terminus of the Batang Hari (Djambi River), while a branch line from Rantau Ilir should serve to connect the fertile centers of Moeara Laboeh and Korintji. As a connecting port in Indragiri, the choice lies between Koeala Tjenako, Pengalian, or the ocean port of Tembilahan. Further to the north the longitudinal line later will need to connect Taloek, Bankinang, and Pasirpengarajan with the port of Pakanbaroe on the Siak River.

For the proper development of central Sumatra, it is necessary to redeem the most fertile and, at the same time, the most isolated districts of Moeara Boengo, Batang Hari (Djambi River), Moeara Laboeh, and Korintji by establishing railway connection between these places and a port on the east coast along the shortest and most economic route possible. In this case the most suitable ports to be considered first are the river ports of Koeala Tjenako or Pengalian, on the Indragiri River, which are always accessible for coasting vessels, and Tembilahan on the estuary of the Indragiri River, using Tembilahan, as soon as necessary, for an ocean port. Rengat, not always accessible for coasting vessels of 500 to 600 tons, is unsuitable as a regular port of shipment. The complete equipment of Tembilahan as an ocean port can not be justified from an economic viewpoint so long as it remains impracticable for rail connection with such excellent agricultural areas as Moeara Laboeh and Korintji.

Another important river port is to be found in Pakanbaroe, on the Siak River, which is always accessible for vessels of 600 tons. Pakanbaroe, however, is economically unsuitable as a port of shipment for the economic center of mid Sumatra in that a connection there *via* Taloek would necessarily increase the length of the Central Sumatra Railway to such an extent that it would not be possible for Moeara Laboeh and Korintji effectively to compete with the automobile traffic on the west coast of Sumatra.

Even for a connection later with a port of shipment, such as Soengei Paking, on the estuary of the Siak River, Pakanbaroe is unsuitable. The distance, 160 kilometers, is far too great and the districts to be traversed are not sufficiently fertile. From Koeala Tjienako or Pengalian to Tambilahan, in Indragiri, the distance is but 50 to 60 kilometers, and a fertile area will be traversed. Pakanbaroe, however, should be connected later when the work of construction of the longitudinal railway communication between the Kwantan district and the area situated north of it is undertaken.

This longitudinal communication, which should run from Pranap to Pakanbaroe *via* Taloek and Moeara Lemboe, with an extension *via* Bangkinang and Pasir Pengarajan to the Deli district, at present is not necessary, but later may be constructed in sections if funds are available, beginning, for instance, with the section Pranap-Taloek-Moeara Lemboe, abut 90 kilometers in length. This section of 90 kilometers runs through an economically developed area, where much is expected in the way of mineral resources and may afford communication later with the coal fields near Moeara Lemboe. This district, moreover, is orientated toward the Kwantan districts.

Any communication between central Sumatra and a second harbor (Pakan Baroe) thus at present is not a matter of urgency.

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

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遠東時報

THE HONORABLE JOHN V. A. MACMURRAY

UNITED STATES MINISTER TO CHINA

By George E. Sokolsky

THE KYOTO CONFERENCE

By George Bronson Rea

MANCHURIA AT THE KYOTO CONFERENCE

By George Bronson Rea

JAPAN AND THE NAVAL CONFERENCE

By K. Sato

Vol. XXV November, 1929 No. 11

SHANGHAI, PEKING, TOKYO AND MANILA

pure and simple, and not naval reduction! Japan for one will not, and cannot, tolerate such an anomaly. It is understood that she will make a strong protest if the Anglo-American parity in the form already published assumes the semblance of materialization. She will, on the other hand exert her utmost influence to prevail on others to agree on drastic naval reduction.

An interesting object of speculation under the circumstance would be how far Japan is prepared to subordinate her ratio claim to her all important point of decisive reduction. Needless to say that she wishes to get both if possible: with these double objects in view her delegates will fight in the preliminary talks as well as in the conference. But suppose she will have to surrender either one, what will she do? The ratio question has a touch of egoism, the insistence on reduction has a guise of altruism. It is up to Mr. Wakatsuki to use his best tactics to get the most for the least sacrifice in such a matter he is adept enough. But if in spite of clever strategy Japan had to give up either one of the two demands, which would she sacrifice? Without doubt the ratio. That is to say that Japan will not walk out of the conference even if, through American opposition, her ratio claim creates a deadlock. For Japan would consider that if she can get any material reduction of her naval expenditure through the conference, she has still good reasons to regard it to have been highly fruitful, if not perfectly successful. Japan attends the London Conference, then, with a spirit of mutual conciliation and accommodation; the peculiar national predicament in which she finds herself does not warrant of any other course.

APPENDIX:

Comparative Naval Strength Japan, U.S. and Britain

Compiled from Official Sources

Vessels	Japan		America		Britain	
	No.	Tonnage	No.	Tonnage	No.	Tonnage
Cruisers with 8-inch guns:						
In commission	8	68,400	1	10,000	15	148,400
Building	4	40,000	7	70,000	4	36,800
Planned	—	—	15	150,000	3	30,000
Total	12	08,400	23	230,000	22	215,200
Smaller cruisers with 6-in. guns:						
In commission	21	98,415	10	70,500	41	189,545
Building	—	—	—	—	—	—
Planned	—	—	—	—	2	13,000
Total	21	98,415	10	70,500	43	202,545
Destroyers:						
Total	119	32,495	262	268,730	183	196,710
Submarines:						
Total	71	78,497	123	87,313	76	79,362

It may be noted that in the important category of large cruisers, exclusive of vessels planned, Japan has 108,400 tons for America's 80,000 tons and Britain's 185,200 tons.

In smaller cruisers Japan's possession exceeds America's by nearly 30,000 tons and Britain has Japan's double.

In destroyers Japan has half of American possession and Britain stands at middle point between the two.

In submarine the respective possession of the three Powers shows only a small difference.

(Only those cruisers which are under the age of two years are included in the table. In case of destroyers the age limit is 16 years; in submarines it is 13 years.)

The Kyoto Conference

(Continued from page 485).

These conferences are of great help towards cementing international friendships, but the Rotarians, Kiwanis Clubs, Y.M.C.A., Y.W.C.A. and other groupings of congenial spirits accomplish the same purpose. The recent meeting of the International Chamber of Commerce at Amsterdam brought the businessmen and bankers of China into touch with world realities and provided the proper occasion to discuss one of the most important problems confronting international finance. The 1928 session of the Williamstown Institute of Politics accomplished more towards clarifying the Manchurian situation than any other gathering since the Washington Conference. There, in an open forum for all the world to hear, the Chinese Minister to Washington and Japan's Consul General at New York, officially stated their respective sides of the controversy and every word was faithfully communicated to the public by an intelligent and appreciative press.

The secretive Kyoto proceedings failed to add anything to the world's knowledge about the basic Manchurian problem or change in any way the official position as laid down at the Washington Conference, and emphasized at Williamstown. The Kyoto Conference however stressed one important point. It brought forth Japan's final answer to China on Manchuria. Blunt, indirect, unofficial and without binding force, Mr. Matsuoka's rejoinder to Dr. Hsu Shu-hai was as much an official pronouncement of Japan's irreducible minimum for the solution of the Manchurian problem as though it emanated from the highest official spokesman for the Empire.

It is unlikely that the message of Japan contained in that rejoinder will ever be communicated to the Chinese people. We doubt if it will receive notice or editorial discussion in any Chinese newspaper. It will never be referred to by the Chinese educators in the class rooms of their colleges. In their superior way, the Chinese will ignore it and any reference to it will be denounced as Japanese propaganda. The Chinese will continue their boycotts, agitations and "direct action" to compel Japan to accept their viewpoint, until some incident precipitates a show-down. If the Kyoto Conference succeeds, even in a small way, in educating Chinese public opinion to the realities of the situation and a better understanding and appreciation of Japan's position, and paves the way for more dispassionate discussion of facts, that will eventually lead to an amicable settlement of the dispute, the Institute of Pacific Relations will have justified its existence and further usefulness.

The Kowloon-Canton Railway

The Kowloon-Canton Railway (British Section) had a very successful year during 1928. Since the adoption of the new system of accounts, its revenues, for the first time, shewed an excess over working expenses. The accounts showed a balance net revenue of $20,040.73. This figure would be considerably augmented were the transport of government passengers and rent of railway quarters to be included, and the Russian Rails written down not charged to working expenses. The total net revenue amounted to $59,416.07.

Negotiations regarding the acquisition of three new special locomotives for hauling the through express trains were continued with the Chinese Section, but a final decision as to the purchase has not as yet been reached.

On the engineering side, the only new works of significance were in connection with improvement to Taipo Market Station providing for a proper passenger platform, a goods siding and dock, and the use of the loop line for all stopping trains. The work was completed and the new arrangements brought into use by the end of 1928.

The concrete sleeper depôt made 5,070 reinforced concrete sleepers and 35 reinforced concrete kilometre posts for the use of the Railway during the year. Reinforced concrete slabs were laid on the gantries of Bridges Nos. 10, 25 and 33 in substitution of wooden planks. The overhead bridge at Gascoigne Road, the foot-bridge at Holt's Crossing, Bridge No. 30 at Taipo and the steelwork of Taipo Pier were scraped and painted. The reinforced concrete wharf at Kowloon Station which was twice damaged by the collision by launches, were duly repaired.

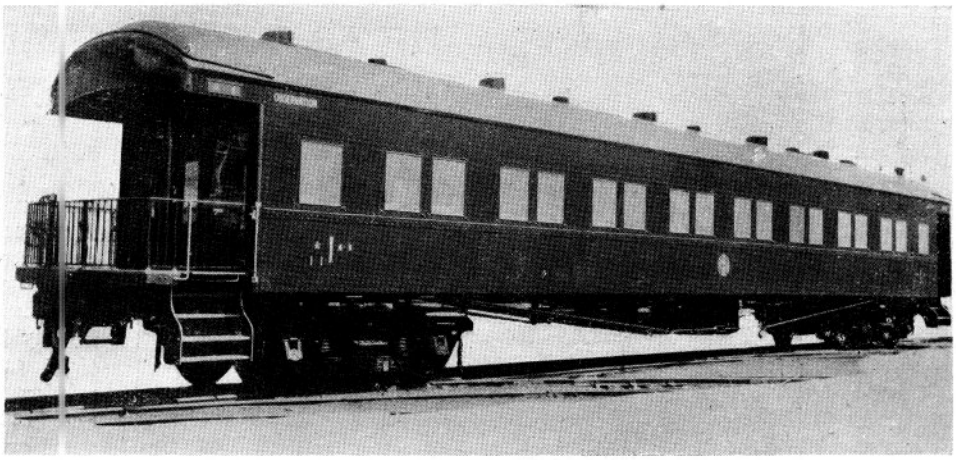
An accommodation road bridge of 28 feet span was found necessary at Mile 15¾. Work was commenced in November, 1928, and will be completed in 1929.

The principal item of track maintenance involved the relaying of Beacon Hill Tunnel (2,403 yards) with new 85-lb. flat-bottomed rails, found necessary, owing to a number of rail breakages suddenly occurring. There appears to be an abnormal amount of rail wear in this tunnel on account of the severe grades and damp patches.

Locomotives and Passenger Cars for the Kirin-Hailung Railway

On the morning of the 29th of September, the Motor Ship *Beljeanne* quietly nosed into her berth at Dairen with an epoch-making cargo on her deck and in her hold, as, for the first time in the history of the Far East, Locomotives and Passenger cars were brought to these coasts and landed on the dock in a fully erected condition—and practically ready for immediate service.

In February of this year the American Locomotive Company, and the American Car & Foundry Company concluded a contract through Messrs Arnhold & Company, Ltd., with the Kirin-Hailung Railway; the former Builder to furnish three Pacific Type Passenger and three Mikado Type Freight Locomotives,—while the latter Company was to furnish 11 Passenger Cars of various classes, including one Observation Car.



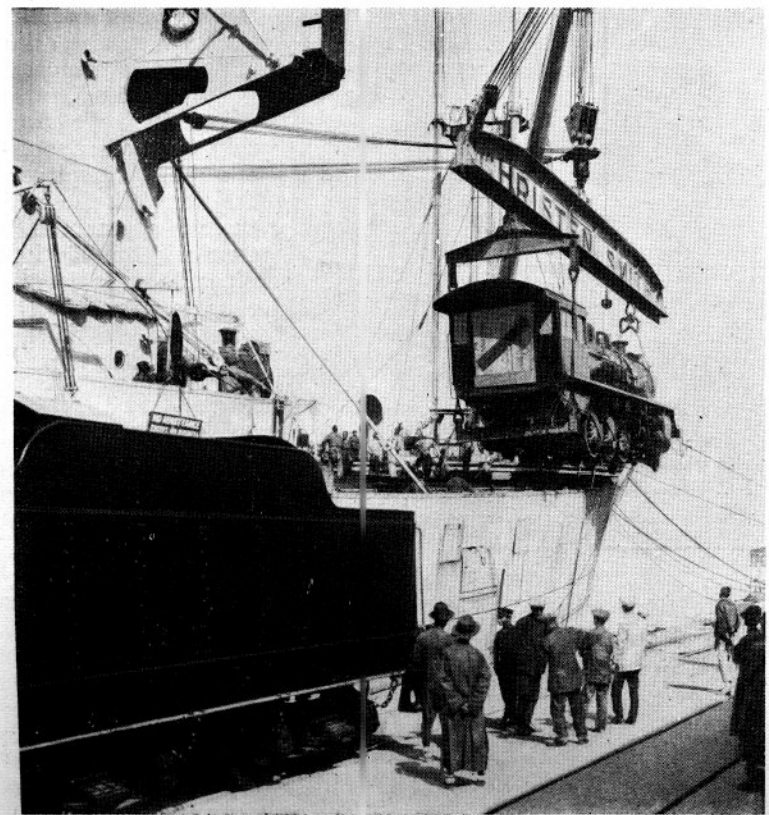
An Observation Car on the Kirin-Hailung Railway

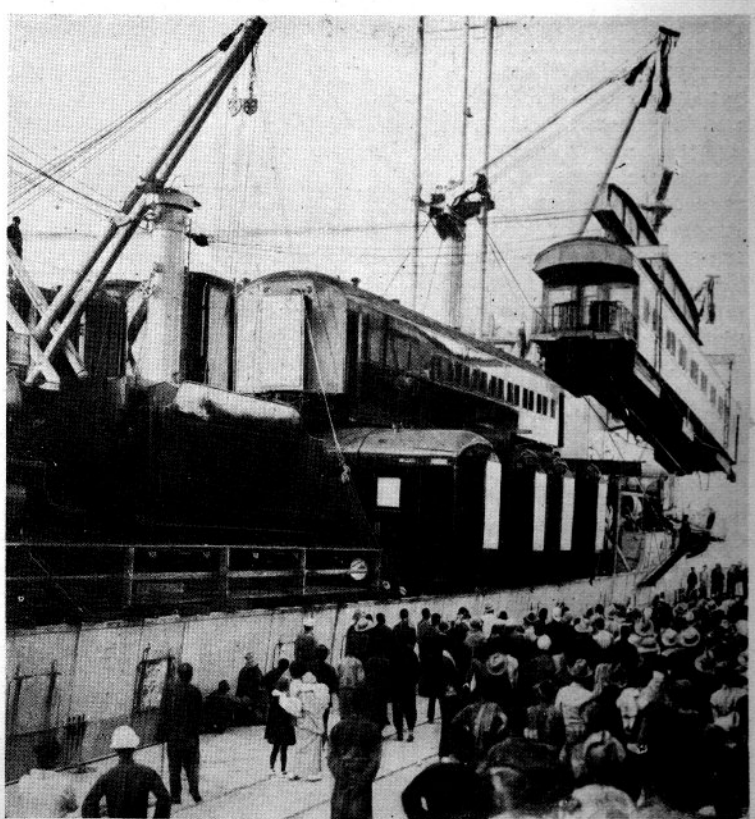
It speaks well for the equipment of the steamer that these locomotives and cars, weighing approximately 100 tons and 40 tons respectively, could be loaded by the ship's gear at the Atlantic seaboard,—make the trip of 54 days to Dairen, through typhoon and heavy seas,—unload the cargo and place on the rails 20 feet from the ship's side, delivered in practically a perfect condition.

The three Mikado Type Locomotives are duplicates of engines furnished by the American Locomotive Company to the same Railway, which were placed in service about one year ago. The "Pacifics" are a new type to this Railway—but not to the Chinese Government Railways, for this Builder has furnished a large number of both of these types to various Railways in the Orient in the past few years.

A very distinctive feature of these engines lies in the most thorough interchangeability which has been arranged between the two types, where similar parts and details subject to replacement through natural wear or other causes are the same in both types. This feature takes in such items as the Boilers (including tubes, flues, fireboxes, etc, etc.), Cylinders,—and a multitude of parts of the running gear, which are identical in the two types. This feature of design has for years been the policy of the American Locomotive Company in the building of locomotives for the foreign market, where allowed a free hand in the design; and was adopted for the purpose of assisting the Railways to reduce to the minimum the amount of spare parts to be carried in the Stores stocks, and to reduce the cost, as well as the time, for the necessary maintenance of the engines. To the consumers, far from the source of the supply of such spare parts which must be purchased

(Continued on page 510).





Locomotives and Passenger Cars Delivered at Dairen

The Ceylon Government Railway

THE Ceylon Government Railway is one of the largest departments of Ceylon Administration according to *Commerce Reports*. To assist in its management an unofficial Railway Advisory Board is appointed by the Government.

The railway originally consisted of a line less than 100 miles in length extending between Colombo and Kandy. Construction of this line was begun on August 3, 1858, by the Ceylon Railway Co., which had been formed in England 10 years earlier and later reorganized for this purpose. The contract of the company provided for the deposit, in the Bank of England, of £40,000 as first installment of capital, bearing guaranteed interest at 6 per cent., the Ceylon Government reserving the right of acquiring shares in the company to the extent of £50,000, with power to nominate a director to the board, in addition to the *ex officio* director nominated by the Secretary of State of England.

The original estimate of the company for the construction of the line was placed at £856,554. At the end of 1861, as the railway had not been completed and the expenditure had far exceeded that amount, the Ceylon Government decided to dissolve the contract. The capital subscribed (£297,500) was paid off, and the Government took over the liabilities and assets.

Under a contract awarded January 9, 1863, for the sum of £873,040, the line was completed and opened to traffic on April 25, 1867. The railway afforded an outlet for the coffee industry of the interior of the island, bringing that section within a few hours journey of Colombo.

In response to the demand for further extensions, contracts have since then been awarded for various branches until at the present time the railway is 1,125 miles in length and comprises 704 miles of main lines, 278 miles of branches, and 143 miles of sidings. There are five main lines radiating from Colombo, one of 256 miles extending to Kankesanturai, one of 99 miles to Matara, one of 83 miles to Puttalam, one of 181 miles to Badulla, and one of 85 miles to Opanake. The branch lines are six in number, one of 19 miles from Nanu-Oya to Ragalla, one of 22 miles from Peradeniya Junction to Kandy and Matale, one of 54 miles from Madawachchi to Talaimannar, one of 98 miles from Maho to Trincomalee, one of 65 miles from Gal-Oya to Batticaloa, and one of 10 miles from Avisawella to Yatiyantota.

A route from Matara, at the extreme southern end of the island, to Hambantota is proposed. The linking up of the section from Polonnaruwa to Batticaloa is indicative of the prosperity of Ceylon, as this connects large paddy-growing districts of the eastern province, which previously were accessible to the other parts of the island only by steamer and road transport. Another recent improvement was the completion of the line from Chilaw on the western side of the island to Pullalam, traversing the low-lying district devoted to the coconut industry.

Revenues from the operation of the railway during 1927 (the latest year for which figures are available) amounted to $10,856,228, and from the rail-motor cars, $32,372; or, a total revenue from railway operations of $10,888,900. In addition, a revenue of $1,511 was received from the road bus service.

The cost of operating the railway during the same period amounted to $7,148,540 for the railway proper and $22,522 for the rail-motor cars, or a total of $7,171,062. Other expenses incurred by the railway during 1927 consisted of $11,145 for the cost of road-bus service and $238,698 for pensions and gratuities.

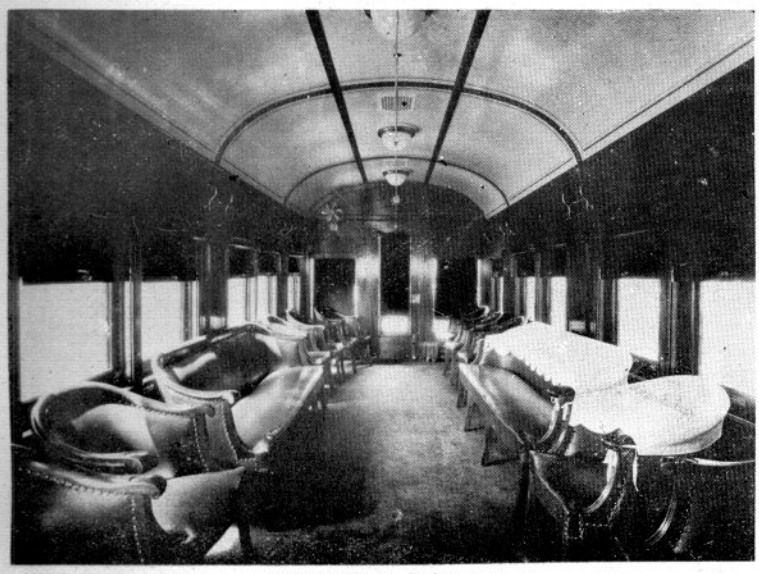
The total freight tonnage in 1927 amounted to 1,621,636. The freight-ton mileage was 1,621,636, and freight-train miles aggregated 1,505,469.

During the same period the passenger traffic comprised 208,223 season-ticket holders and 16,948,655 others.

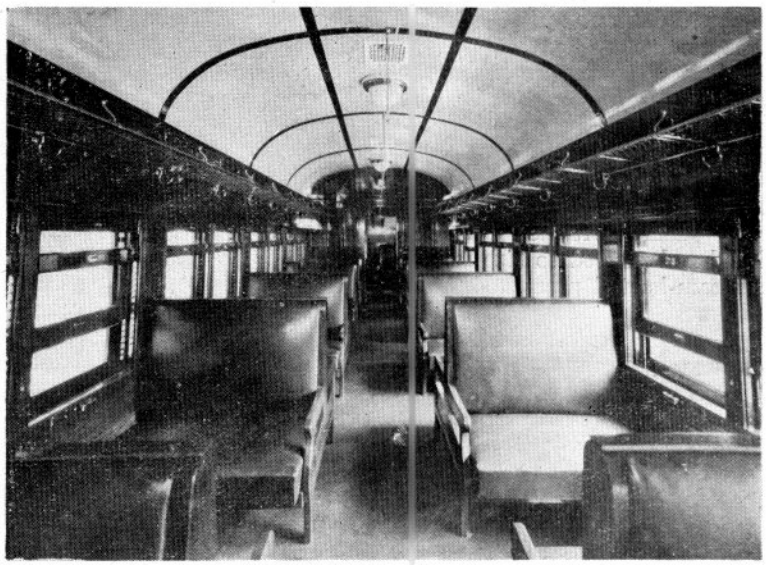
Rolling stock of the railway at the end of 1927 consisted of 234 locomotives, 2,548 freight cars, and 1,249 passenger cars.

Locomotives and Passenger Cars for the Kirin-Hailung Railway

(Continued from page 503)



First Class Saloon



Second Class Section

Interior Views of the Cars

from abroad, this feature has, and ever should, commend itself as a most excellent method of design, and a thoroughly sound business proposition.

Passenger Cars

The equipment of Passenger Cars furnished by the American Car & Foundry Company consists of :—

One 1st Class Passenger and Saloon Car, at one end of which are four Coupes capable of seating 32 passengers, while the other end is provided with a Saloon having a seating capacity for 18 people. The rear, or Saloon end of the car has a rail enclosed Observation Platform. The entire car is luxuriously fitted out with upholstered furniture, and has superior interior decorations as may be seen from the photographs.

The two combination 1st and 2nd Class Passenger Cars are fitted out in the same superior style,—having very comfortable leather upholstered seats. The seating capacity of the 1st Class section is 22, while the 2nd Class section will accommodate 40 people.

The eight 3rd Class cars, seating 110 people each, have the same first class workmanship as obtains on each of the other classes, and the seating arrangement and interior finish, is well in advance of the usual requirements for this class of service.

All cars are equipped with Westinghouse Air Brakes and Air Signal service, and have the "Gold Direct System" for steam heating the train. Each car is lighted with electricity, which is generated by the "Safety" axle generator system when the car is in motion, and furnished by a system of batteries when standing still. All cars are equipped with the standard M.C.B. automatic couplers and, with the exception of the observation platform of the Saloon car, all have vestibule platforms.

Coal Mining in Manchuria

THE most important undertaking of the Company, next to the railways, is coal mining, carried on at Fushun and Yentai. The investment in this industry amounted to Y.102,700,000 at the close of the fiscal year ending March 31, 1928. During this fiscal year the product of the mines, amounting to 7,429,324 tons was sold; the gross receipts were Y.82,787,419 and the expenses Y.73,039,119, leaving Y.9,748,300 as net profit. The annual output amounts to 6,982,870 tons, more than 26,000 tons a day. In the year 1907, when the Company took over this undertaking, the daily output was only 300 tons.

The Company is fortunate in operating a rich coal-bed like that at Fushun, the largest open cut in the world. Fushun lies in the valley of the Hun river, a little over twenty miles east of Mukden. It runs east and west about 10 miles parallel with the river and from north to south 2½ miles, covering 23 square miles. The seam is interbedded in the tertiary stratum with a northerly dip of about 30 degrees and with an average thickness of 130 feet, the thickest part being 430 feet. The general thickness of coal seams in Germany, Great Britain, and the United States is said to be from two to forty feet. Whatever the facts, the deposit in Fushun is exceedingly large, being estimated at from 952,000,000 to 1,200,000,000 tons. Probably no similar reserve can be found anywhere in the world in such a relatively small area.

The district has a long history. Coal was first worked by Koreans some 600 years ago, and was used for the baking of earthenware. Three hundred years later, further digging was prohibited for the curious reason that it was near the mausoleum of a Manchu Emperor, built in the suburbs of Mukden. Prior to and during the Russo-Japanese war, the mines were operated by Russians on a small scale for their own needs, the daily output amounting to 300 tons. After the war, the Japanese military authorities carried on the mining until it was turned over in 1907 to the South Manchuria Railway Company, together with the Yentai and other minor fields. Then it entered a new era of large-scale production on a scientific basis, equipped with modern machinery, mostly imported from the United States and Germany.

As a first step in the most advanced scientific and technical operation, Dr. Buichiro Matsuda, chief engineer of the Mitsubishi Mining Co., was invited by the Company to occupy the post of Superintendent-General of the Mine in January, 1907. Dr. Matsuda lost no time in applying what was known as the first stage of the program of developing the mine. By this the Company improved three old pits and opened two new pits on a large scale; one of which was named the "Oyama Pit" and the other the "Togo Pit." This program was completed in 1912 at the cost of Y.9,200,000, and the daily output was increased from 360 to 5,000 tons.

Pressed by the increasing demand, however, the Company, as the second stage in developing the Fushun mine, introduced the open-cut mining method at two places, besides opening three new pits. The new sand-flushing method was adopted, with an electrified sand-carrying railway, supplied with current from a Mond Gas power plant. As the result of this improvement, the average capacity of production increased to about 7,000 tons, or three million tons annually, in 1918. But the demand for coal continued to increase, due to industrial expansion in Manchuria and Korea, and also to the greater use of coal by the natives in place of their former fuel, kaoliang stalks, which necessitated the import of coal into Manchuria to the extent of 150,000 tons in 1908, and 490,000 tons in 1909. To meet the ever-increasing demand from growing industries, particularly that of the Anshan Iron Works, the Company planned another expansion. This resulted in a so-called "Ten Year Program" drawn up in 1919 and modified in 1924 as the third stage of mining development, by which the excavation of a large shaft at Lunfeng, the open cut of the remaining seams extending from Kuchengtze to the Yangpaipu brook, and the extension of the open cut of Chien-chinchai so as to connect with that of Kuchengtze, were to be worked. With the completion of this scheme, the annual output from Fushun Mines, excluding Yentai Mines, is expected to be over 8,000,000 tons in the fiscal year 1933.

The following table in English tons shows the quantity of coal produced and sold:—

Years	Quantity of coal transferred from previous year	Quantity of production	Quantity purchased	Total	Quantity sold
1907-8.....	18,712	233,325	—	233,325	202,320
1912-3.....	367,541	1,513,254	86,046	1,599,315	1,639,955
1917-8.....	134,192	2,389,584	358,492	2,748,076	2,712,301
1922-3.....	682,938	3,921,727	346,470	4,268,197	4,536,004
1927-8.....	466,672	6,982,870	573,858	7,556,728	7,429,624

The table below shows the growth of the mining industry at intervals of five years since 1907:—

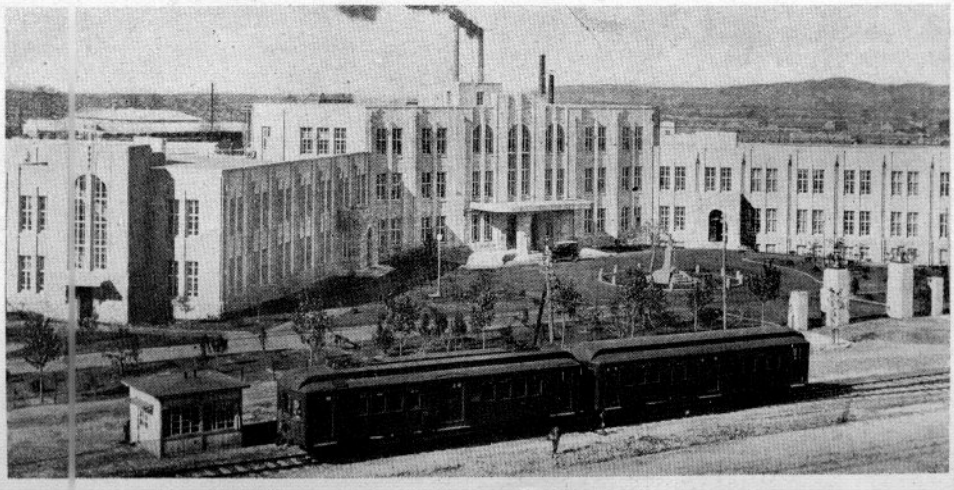
Years	Receipts: Sale of coal Yen	Sale of other minerals Yen	Other Yen	Total Yen	Expenditure Yen	Profit Yen
1907-8	1,318,676	—	215	1,318,891	765,886	533,005
1912-3	9,156,631	—	37,122	9,193,753	7,347,091	1,846,622
1917-8	20,030,480	294,042	43,941	20,368,463	15,047,917	5,320,546
1922-3	51,665,247	202,724	1,271,952	53,139,923	46,424,196	6,715,727
1927-8	80,509,052	273,113	2,005,257	82,787,419	73,039,119	9,748,300

It is of interest to note the disposal of the coal sold in the fiscal year 1927. Of 7,429,000 tons sold, Manchuria consumed 3,326,000 tons, of which 1,323,000 tons were for account of the S.M.R. itself, 65,000 tons used by employees, and 1,937,000 tons by other consumers. Exports amounted 3,401,000 tons, of which Japan proper purchased 1,695,000 tons, Korea 417,000 tons, Taiwan 4,000 tons, North China 180,000 tons, South China 922,000 tons, while 183,000 tons went to points in the South Seas. More than 703,000 tons were furnished to steamers for bunker coal.

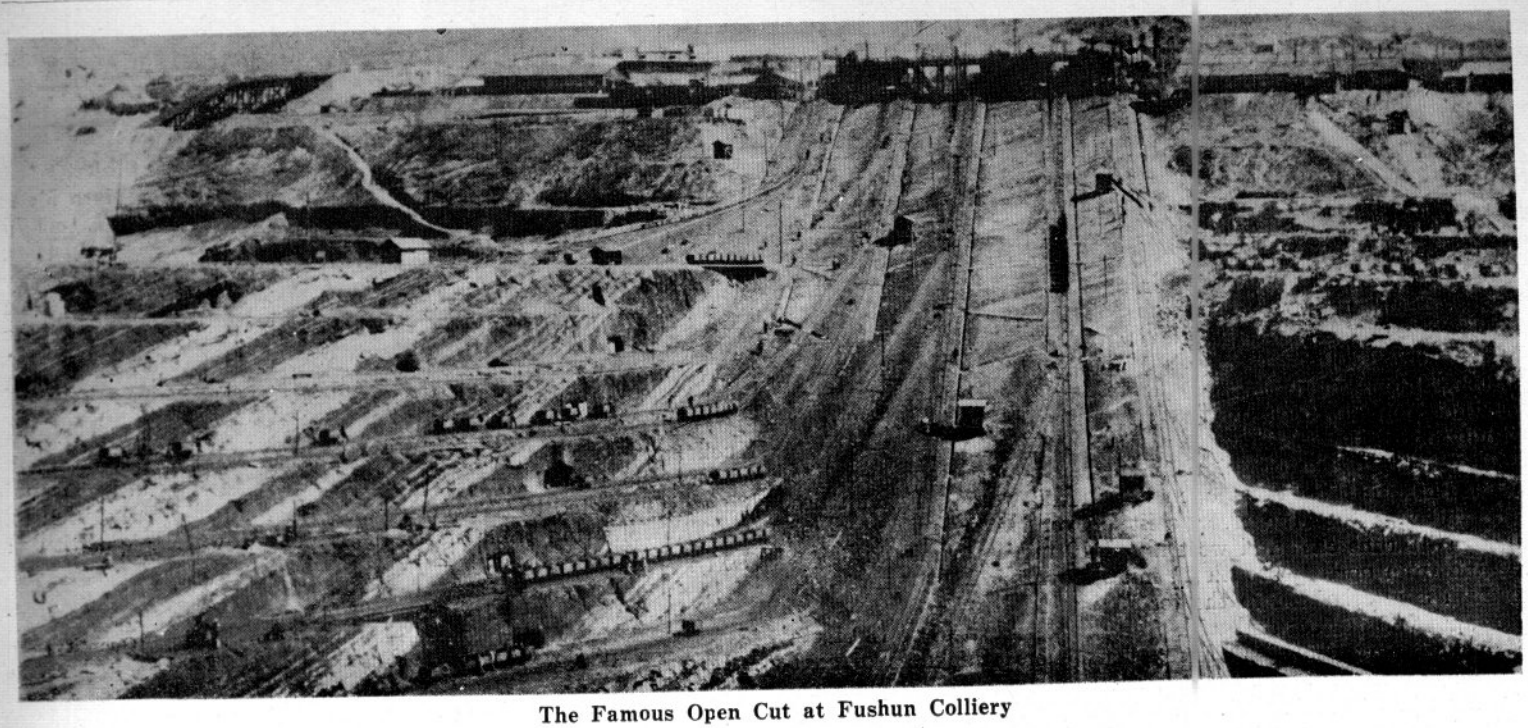
Shale Oil Plant

At Fushun Mine, there are also huge reserves of oil shale right above the coal bed. The Fushun oil shale running east and west for ten miles and north and south for one mile, being 450 feet deep in the thickest part, is estimated at as much as 5,300,000,000 tons. This shale contains an average of six per cent. of oil, the upper part of the seam containing 10-12 per cent. and gradually being reduced to 1 or 3 per cent. at the lower level, besides 0.55 per cent. of nitrogen.

The combustible capacity of the oil shale taken from the Oyama shaft, being incidentally discovered in 1911, the shale was sent to the Central Laboratory, Dairen, for test, in the following year. But in those days the utilization of oil shale,



The Full View of the Office of the Coal Mine at Fushun

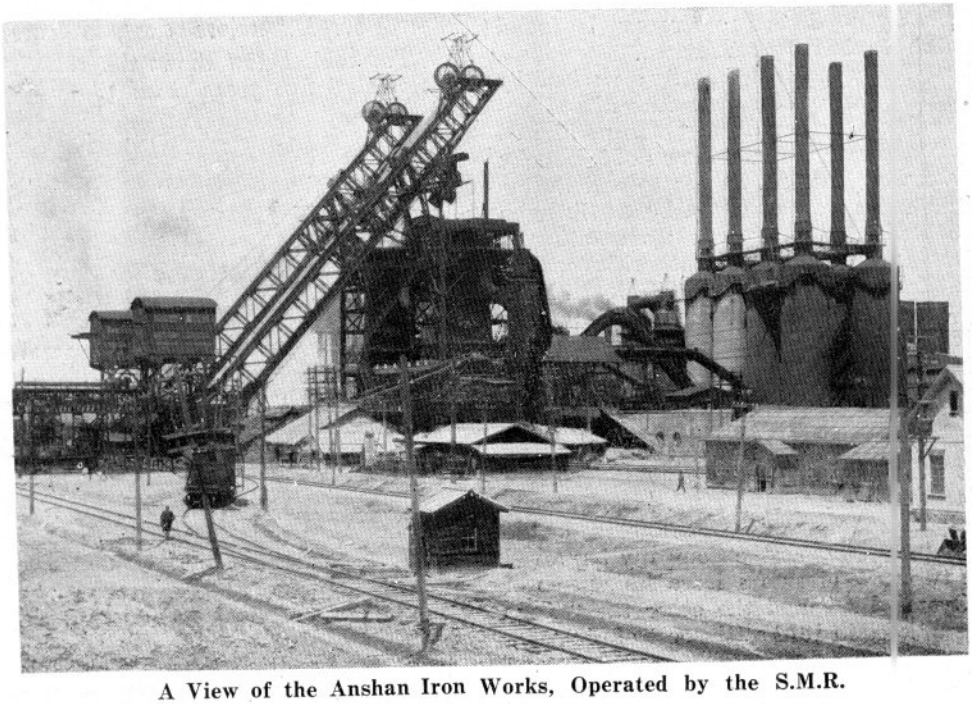


The Famous Open Cut at Fushun Colliery

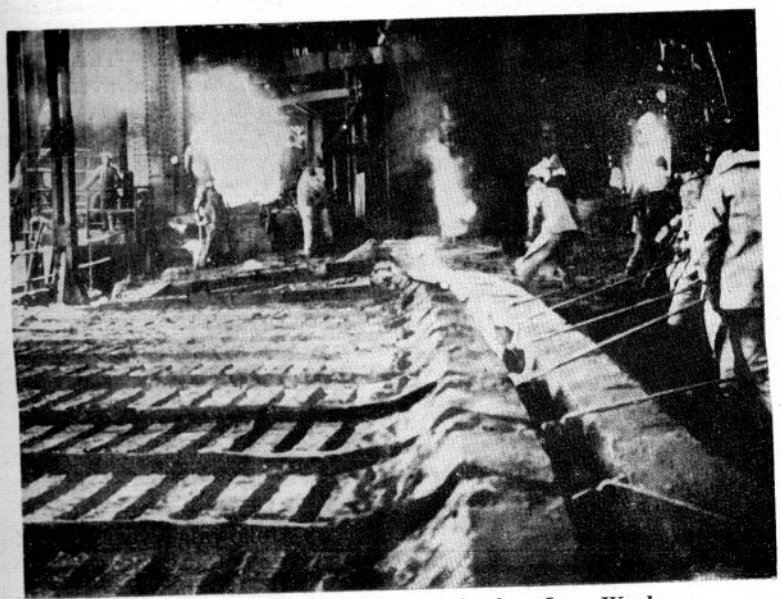
however, was regarded as commercially impossible even in Germany and elsewhere, Scotland only excepted. But the wonderful development of the airplane and automobile, and the extensive application of the Diesel engine to ships and to the industries utilizing oil during and after the European war, revolutionized the fuel question, and petroleum has become one of the fundamental bases of the industrial and military life of a nation. The consumption of this product in Japan is steadily increasing.

The annual consumption was about 350,000 tons in 1919; it was increased to 1,000,000 tons in 1928, of which more than two-thirds were imported. Thus Japan herself is confronted with this important oil question.

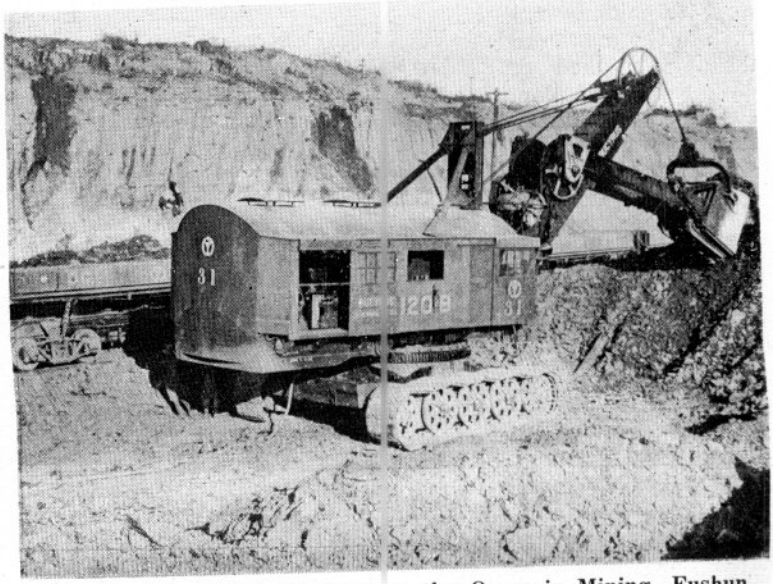
Meanwhile, the South Manchuria Railway Company was most seriously studying its industrial workability by utilizing oil shale at Fushun. In order to ascertain whether the shale is really suited for industrial operation, several hundred tons of Fushun shale were sent in 1920-2 to the Fuel Research Station of the Japanese Navy, to Sweden, and to Scotland for test. Subsequently, several experts in the Company's



A View of the Anshan Iron Works, Operated by the S.M.R.



The Operation of Puddling at Anshan Iron Works



The Electric Shovel Working at the Open-air Mining, Fushun

service were despatched abroad to investigate fully existing enterprises, in addition to the scientific side of the question. In 1925, a so-called semi-industrial plant was set up, and a process for extracting oil by dry distillation was successfully worked out.

Based on this process, the Company finally decided to establish a shale oil plant at Fushun with the capital allotted of Y 8,500,000. This plant is to manufacture about 70,000 tons of the crude oil and by-products, 18,000 tons of ammonium sulphate, and 7,000 tons of paraffin. Oil production is to be gradually increased.

Iron Works

The South Manchuria Railway Company early contemplated working the iron ore found in great quantities at Anshan. The presence of iron deposits here was discovered in 1909 by the officials of the Geological Institute of the Company. By an agreement

Steam Bucket Excavator, Removing Earth Above Coal Bed, at Fushun Open Cut

signed in 1914 with China, a concession to work this iron mine was given to the Chenhsing Kungsu, a Sino-Japanese company. It was also arranged that the ore produced at the mines owned and operated by this concern should be supplied to the South Manchuria Railway Company.

The original plan was to erect a plant large enough to produce 1,000,000 tons of pig-iron a year, or 800,000 tons of steel. Two blast furnaces, were to be erected as the first stage of the original plan. Construction of the first furnace was set about in May, 1917, and completed in December, 1918. Pig-iron was first produced in May, 1919. When the construction of the second furnace was about completed at the beginning of 1920, the price of pig-iron fell from Y.440 a ton in war-time to Y.50, owing to the world-wide depression after the war.

With a view to adjusting the enterprise to the new conditions, the second furnace was not put in service, and further construction of the third and fourth furnaces planned as the second stage in the original scheme was stopped. Yet Japan was pressed by the necessity of this product to meet her ever-developing industry, and the South Manchuria Railway Company, therefore, continued to develop this undertaking, although it involved heavy financial loss. With a view to utilizing ore of low percentage and at the same time readjusting and improving the plant, in order to cover expenses, an investigation board was organized in January, 1920. A group of American scientists and practical engineers, headed by Professor Appleby, of the University of Minnesota, were invited in June, 1921 to Anshan, where they spent more than forty days, and made a thorough investigation into the nature of the ore and its possibilities. Meanwhile, more advanced processes, the so-called hematite reducing system and magnetic concentration system, by which the percentage of iron can be increased to 55 on an average, were invented by one of the Japanese experts attached to the plant. In September, the original plant was modified as follows:

(1) Annual output should be to the extent of 200,000 tons by using two blast furnaces; (2) A large concentration plant should be built; (3) Plants manufacturing by-products, ammonia sulphate, benzol, naphthaline, etc. should be augmented. This readjustment was to be carried out within two years from 1924 at an additional expenditure of Y.11,000,000. The total capital invested from 1919 to March 31, 1927, amounting to Y.45,900,000, has been spent on this iron works, which contain two blast furnaces, four coke ovens, each with a daily capacity of 700 tons; by-products, plants, gas works, electric plant, etc. There are thirty-five miles of railway connecting the mines with the works.

For the fiscal year ending March, 1928, 203,445 tons of pig-iron were produced, an increase of 38,391 tons compared with the former fiscal year. Expenditure for the same period was enormously decreased. Furthermore, the capital stock being reduced from Y.45,000,000 to Y.20,700,000, it was anticipated the loss account on this plant would be converted into a profit account in the fiscal year ending March, 1929.

The following table reveals the general condition of the iron works at Anshan:—

Year	Annual Production Tons	Income Yen	Expenditure Yen	Loss Yen
1919-20	31,620	2,796,224	4,283,392	1,487,168
1920-1	75,273	1,580,655	8,003,233	6,422,577
1921-2	57,184	3,606,999	6,480,725	2,873,726
1922-3	66,543	3,386,935	6,585,278	3,198,343
1923-4	72,311	3,703,690	5,944,588	2,240,897
1924-5	94,501	4,430,753	7,386,361	2,955,607
1925-6	88,263	3,986,931	7,706,920	3,719,989
1926-7	162,455	6,896,504	10,703,098	3,806,594
1927-8	203,454	9,223,114	9,380,656	157,542

In 1928, one more blast furnace having a daily capacity of 500 tons was to be set up. By this the annual production of pig-iron can be increased to 300,000 tons.

South-Western Aviation Corporation Under Organization

A new aviation enterprise, to be known as the South-Western Aviation Corporation, will shortly be organized here under the directorship of Commander Chang Hui-chang, Director of the Aviation Department of the Ministry of War, and Commander Liu Pei-chuan, the well-known Yunnan aviator. Initial expenses for the establishment of the Company have been estimated at $3,000,000. According to the proposed scheme, arrangements will first be made for the installation of a Nanking-Canton-Yunnan air service, expenses for which will be jointly borne by the Kiangsu, Kwangtung and Yunnan Provincial Governments, Branch Offices of the Company will be established in the three centers so as to facilitate administration of the service. In view of the need of preparations at the end of the line in Yunnan, Commander Liu Pei-chuan will shortly leave for Yunnan on his airplane "Golden Horse," by way of Hankow, Changsha and Canton.

South Manchuria Railway Co., Ltd.

Plans for manufacturing sulphate of ammonia by the South Manchuria Railway Co., Ltd. are progressing steadily. According to the report, 100,000 tons of raw material will be obtained from Anshung Iron Works and 200,000 tons from the Showa Seiko K.K. and total production is expected to be about 300,000 tons, an increase of 292,000 tons over the present production of 8,000 tons (of which 5,000 tons from Chufun and 3,000 tons from Anshung). The company will use the Ude method.

Engineering Notes

ELECTRIC LIGHT, POWER AND TRACTION

SOUTH MANCHURIA ELECTRICITY CO. The South Manchuria Electricity Co. plans to spend about Y.2,500,000 for the estimated new enterprises during the next fiscal year.

One of the chief items is to instal new generators at the Amanogawa Power House (on the Hoshigaura tram line) which will cost about Y.2,200,000, which being split up over 2 years, the sum wanted for the next fiscal year will be a little over Y.800,000.

The transmitting lines from the Amanogawa Power House to the Shikishima Circle where the transforming station is located, are now laid along the railway, track, and, on this account, are exposed to frequent damage at the hands of the repairing gangs for the railway track. They are to be relaid along the base of the hill range, which work will cost about Y.300,000.

Other items refer to the construction and alteration of tram cars, improvement of the tram lines and the power transmitting lines, and the extenson of line traffic.

DAI NI FUJI DENRYOKU K.K.—(No. 2 Fuji Electric Power Co., Ltd). It is reported that the Dai Ni Fuji Denryoku K.K. plans to build a power station, capacity 60,000 k.w. in Shizuoka Prefecture. There are to be installed two generators of 2,000 k.w. each and 2 units of 8,000 k.w. each. The company will probably invite estimates on equipments of this power station from all the makers the beginning of next year.

According to this report, the company plans to supply light and power in Shizuoka Prefecture and surplus power is to be supplied to Tokyo district in co-operation with the Fuji Denryoku K.K.

NAGANO PREFECTURE THE LARGEST POWER CENTRE.—The Kogyo Shimbun reports that Nagano and Toyama Prefectures are the largest electric power producing centers in Japan. Especially, in Nagano Prefecture there are 197 points where electric power is generated and the total output of these hydro-electric power plants is estimated at more than 340,000 k.w. The length of power line amounts to more than 292,000 feet, while consumers of light and power in the Prefecture number more than 318,500 houses.

NIPPON ELECTRIC-OSAKA, ALLOWED TO ENTER TOKYO FIELD.—The re-application filed by the Nippon Electric Power Company, Osaka, with the Ministry of Communications for the supply of electric power to Tokyo, Yokohama and their vicinities has been sanctioned by the present Cabinet. The franchise involves the power supply to the district already mentioned, operation of the company's steam plant at Tsurumi and erection of necessary distribution lines.

The district involves Minami-Katsushika-gun, Minami-Adachigun, Kita-Toyoshimagun and Tsurumi in Yokohama City. The power supply is limited to that of motors of more than 100 h.p. The power rate must not be high and that charged by other companies in Nagoya, Kobe and Osaka must be taken into consideration, it is instructed by the Ministry. Work should start within six months after the day of sanction and business opened in less than two years. The amount of power supplied by its Tsurumi steam power plant is 35,000 k.w. The application made by the Daido Electric Power Company for power supply over the same district has been reserved for the future, due to the investigation not having been completed yet. The new franchise given to the Nippon Electric Power Company will not interfere with the business interests of the Tokyo Electric Light Company, declared Mr. Shohachi Kakao, president of this company.

The Toho Electric Power Company has decided to absorb the Gifu Electric Power Company, capitalized at Y.5,000,000, sister institution to the former. The reason of absorption is that the Toho Power's Kanayama power station, capable of generating 4,500 k.w., is nearing completion and there is no necessity for the Gifu Power to exist.

RAILWAYS

THE RAILWAY COMPANIES IN KOREA. The construction of private railway lines in Korea is proceeding steadily. Those now under construction are the Chosen Tetsudo K.K. 50.8 miles, Keinan Tetsudo K.K. 42.3 miles, Kangosan Dentetsu K.K. 15.7 miles and Minami Chosen Tetsudo K.K., 99.5 miles, total 208 miles 24 chains. Besides these construction work on the Keito Tetsudo K.K. will be started in the near future (33.2 miles.)

The first part of construction of 35.3 miles of the Seishuto Junkan Kido K.K. (Seishu Island Encircling Tramway Co., Ltd.) has been completed and was opened to business from September 1, this year. The details of the line under construction are as follows:

Chosen Tetsudo K.K.

Kokai Line: Gauge, 3-ft. 6-in. 17 miles 56 chains. The Tsuruzaki Tunnel (2,772 feet) on the line is not yet completed: the whole line is expected to be opened by October next year. But the line from Shinin to Tsuruzaki will be opened on September 10 of this year.

Shinshu to Mizuhashi line: Gauge 3-ft. 6-in. 17 miles 72 chains, will opened on November 1, this year.

Kaikyo Line: from Shinten to Mozan, Gauge, 3-ft. 6-in. 15 miles 16 chains, expected to be opened on December 1 of this year.

Keinan Tetsudo K.K.

Hirokawa to Okawa line: Gauge 4-ft. 8½-in. expected to be opened on December 1, 1929.

Keinan Tetsudo K.K.

Hirokawa to Itabashi line: Gauge 4-ft. 8½-in. 17 miles 72 chains. There are 3 tunnels between Itabashi and Choko, the total length of them is 7,200 feet, the whole line will be opened by the end of next year.

Kongosan Denki Tetsudo K.K.

Keiri to Kokei line, Gauge 4-ft. 8½-in., 7 miles 40 chains.

Kakei to Kongosan, 8 miles 12 chains. The whole line will be completed by the end of next month.

Minami Chosen Tetsudo K.K.

Raishu to Kosui line, Gauge 4-ft. 8½-in., 9 miles 72 Chains, Construction started on February, at present about 2 per cent of the line has been completed. Expected to be opened by the end of next year.

THE HU-HAI RAILWAY.—The completion of the Hu-hai Railway, running from the suburb of Harbin to Hailun marks the beginning of the huge Chinese program of construction in Manchuria. The Hu-hai Railway is a pure Chinese enterprise, capitalized at $10,487,709 Harbin currency, with a total mileage of 220 kilometers. The managing-director is Mr. Kao Yuan-kun. The railway has to its credit eight locomotives, 220 freight wagons with a capacity of 30 tons each; 50 passenger coaches with a seating capacity for 100 persons each; and before the year ends 10 more locomotives and 200 more freight wagons will be added to its rolling-stock.

Actual construction work started in the spring of 1926, but Mr. B. Ostroumoff the engineer, completed only 20 kilometers from Sunpei, a suburb of Harbin, to Hulan.

Construction of the 200 kilometers from Hulan to Hailun was continued by a Chinese engineer, Shih Yi, and the entire administration both technical and general was in the hands of Chinese. At present, no foreigner is in the employ of the railway, except two advisors. The authorities of the railway are inviting shares from merchants and commercial bodies with a view to converting the railway into a commercial enterprise, so that government funds can be appropriated for the extension of the railway and the construction of other railways in the province.

The gauge of the Hu-hai Railway is 4-ft. 8.5-in., similar to that of the South Manchuria Railway and other Chinese railways. In 1928 the Railway placed an order for five new locomotives and 100 wagons. Notwithstanding the limited activity of the Railway, altogether 500,000 tons of export goods were hauled along the main line, and a considerable number of passengers were carried. The financial condition of the Railway from July 1, 1927 to June 31, 1928 is shown in the following table:

(In Harbin Local Dollars)

REVENUE

1.	From Passenger traffic	$886,000
2.	From freight traffic.	$2,007,000
3.	From other sources	$221,000
Revenues in Total		$3,114,000

EXPENDITURE

1.	General expenses	$224,000
2.	Expenses for exploitation	$558,000
3.	Traction department	$390,000
4.	Machine department	$231,000
5.	Other expenses	$135,000
Revenues in Total		$1,538,000

Revenue	$3,114,000
Expenditure ...	$1,538,000
Profit	$1,576,000

The territory across which the Hu-hai Railway runs, is a high level plain, having on its north, west and east the ranges of the Great Kingan Mountain. Being well irrigated by the tributaries of the Sungari River, it is considered the best region for agricultural purposes in all Manchuria. The number of immigrants from Shantung and Hopei in this region is steadily multiplying. The climatic condition of this territory is also considered better than that of the adjoining highland of Kingan in the west or the hilly regions in the east. The high ranges of the Kingan Mountains in the northwest prevent the Siberian blizzards from sweeping across the land, and for this reason the territory is not so exposed to cold winds as other places in the north and west do. The weather in this territory is comparatively mild, in the summer, however, the mercury rising higher than that in other regions of the same latitude. The annual rainfall in the early part of summer gives enough moisture to the wheat and other cereal crops, thus causing rapid growth, and the dry season that follows makes conditions favourable for the harvest.

Colonization of the territory by Shantung immigrants commenced with the construction of the railway line in 1925, pioneer farmers spreading by thousands along the railway track and reaching remote regions in the interior. Although the terminus of the railway is at Hailun, immigrants have proceeded even as far as Tungpei and Lungjen. It is planned to extend the railway to those places. In view of the fact that this territory is chiefly fit for agricultural purposes, the bulk of the population lives on farming, a very small number being engaged in commercial and industrial undertakings.

CONSTRUCTION OF NEW RAILROAD, FRENCH INDO-CHINA.—The Government-General of Indo-China has presented a plan, having for its object the construction of a railway to link the river port of Phom-Penh with Battambang, a distance of 275 kilometers, states a report from Consul Henry S. Waterman, Saigon,

French Indo-China. This is the central section of the railway 654 kilometers propsed from Saigon to the Siamese frontier, which is included in the plan of the law to provide for a general program of development of the French colonies. The estimated cost of the proposed branch is 17,000,000 piasters ($8,500,000) and the period of execution will be about five years.

CANTON-HANKOW RAILWAY.—Construction of the uncompleted Chuchow-Shiuchow section of the Canton-Hankow Railway will be started shortly, according to an announcement made at the Ministry of Railways. Mr. Sun Fo, Minister of Railways, issued an order to the Peiping-Liaoning, Peiping-Hankow, Tientsin-Pukow and Canton-Hankow Railway Administrations to make monthly remittances to facilitate the immediate starting of the work. All moneys advanced by the various Railways will be refunded as soon as arrangements are completed for the turning over to the Ministry of part of the Returned Boxer Indemnity from Great Britain earmarked for the purpose. The ministerial order specifies that the remittances are to be made beginning with the month of November with the Peiping-Liaoning Railway sending $100,000; the Peiping-Hankow Line, $200,000; the Tientsin-Pukow Line, $80,000 and the Canton-Hankow Line, $120,000.—*Kuo Min.*

ELECTRIC RAILWAY SERVICE TO NIKKO.—The time from Tokyo to Nikko has now been shortened to two hours and forty minutes by the efforts of the Tobu Electric Railway Company, of which Mr. Kaichiro Nezu, of Tokyo, is president.

The line connects Asakusa station, beyond the River Sumida, and Tobu-Nikko, the entrance to the shrine town. The distance from Asakusa to Tobu-Nikko station is 83½ miles, about six miles shorter than the government line. By this line Nikko, from the capital, is reached within three hours by ordinary trains, and two hours and forty minutes by special express trains.

The Tobu Electric Railway Company has expended Y.15,000,000 on the construction of the double track from Sugito to Tobu-Nikko, whose distance is about 58 miles.

The company is extending its line from Asakusa station to Asakusa park, one of Tokyo's amusement centers, crossing the River Sumida, thus directly connecting with the tram-lines and subways in the city. The bridge for this extension over the river is now under construction, between the Azuma and Kototoi bridges.

The electric trains on the Asakusa-Nikko line run every forty minutes from 5 a.m. to 7:45 p.m. The cars are all steel, equipped with up-to-date lighting, heating, ventilation, etc. The special express trains run on Sundays and national holidays, during the maple season in October and November.

The passenger fare is Y.2.23 from Asakusa to Tobu-Nikko station. Tobu-Nikko station connects with the Nikko electric railway to the Toshogu Shrine and Umagaeshi. The maples at Nikko are now at the height of the season.

NEW CHINESE MANCHURIAN RAILWAY.—The North Eastern Communications Commission, Fengtien, has decided to build a new line from Yentungshan Station on the Kirin-Hailungcheng Line to outside South Gate, Changchun, via Shuangyuang to the end of connecting the first mentioned line with the C.E.R. Southern Section at the outlay of $3,000,000 to be put up in an equal share among Kirin and Liaoning Provinces and the Kirin-Hailungcheng Line.

Construction is to be started during the Spring.

INDUSTRIAL

ISHIKAWAJIMA ZOSENJO K. K.—(Ishikawajima Shipbuilding Co.) The Ishikawajima Zosenjo K.K. has taken an order for an ammonia compresser (1,500 h.p. 300 atmospheric pressure) from the Showa Hiryo K.K. (Showa Fertilizer Co., Ltd.) Recently this Company completed negotiations for the manufacturing rights of ammonia compressers of Sulzer Brothers in Japan will be, and the manufactures named "Ishikawajima-Sulzer Compresser."

SODA FACTORY IN SOUTH MANCHURIA.—The South Manchuria Railway Company proposes to erect a soda factory in the Kwantung Leased Territory with a potential annual producing capacity in the course of the first years of up to 50,000 tons. The construction of such a works is called for by the demand for soda on the part of the growing chemical industry in Japan, and the impossibility to satisfy such requirements by the output of the soda factories existing in Japan proper.

MITSUI KOZAN K.K.—(Mitsui Mining Co., Ltd.) The Mitsui Kozan K.K. plans to manufacture anilin dye stuffs, conpound ammonia, etc., of which the manufacture of conpound ammonia by the Claude Process will first be taken up. It is expected that the company will buy machinery and equipment such as Hydrogen extraction equipment, Holders, 6-7 units of compresser of about 1,000 atmospheres, 6 units of gas holders of high pressure, electrolysis tanks and accessories. The total is expected to be about Y.3,000,000 Y.4,000,000.

PETROLEUM AND GAS PRODUCTION IN FORMOSA IN 1928.—According to the Formosan Goverment, the production of petroleum and gas in Formosa in 1928 was as follows:

Shukko Field		
Raw oil	15,678	Kilo Litre.
Volatile oil . ..	2,351	,, ,,
Natural Volatile Oil	365	,, ,,
Gas	1,269,949	Cu. Ft.
Kinsui Field		
Natural Volatile oil.	491	Kilo Litre.
Gas	3,635,350	Cu. Ft.
Taiwan Seiyujo (Taiwan Refinery)		
Volatile oil . ..	4,881	Kilo Litre.
Kerosene oil. ..	2,781	,, ,,
Light oil	2,584	,, ,,
Heavy oil	1,444	,, ,,
Parafine	272,430	,, ,,

YAWATA IRON WORKS.—Since 1927, the Yawata Iron Works has been electrifying its factories. Recently it began operation of a mill, in which a motor with a capacity of 18,000 h.p. of the Allgemeine Electric Company is installed. The total cost of machinery will be about Y.420,000.

The Yawata Iron Works has decided to install 2 units of Babcock boilers, capacity of 20,000 k.w. and one unit of Hitachi Seisakujo's boiler as reserve in No. 4 power station.

This boiler is "Yaro" type, heating surface 13,000 Sq. meters, pressure 371 pounds, most Y.230,000.

MITSUI BUSSAN K.K. AND NIPPON SEKIYU K.K. TO DRILL FOR OIL IN BORNEO.—The Mitsui Bussan K.K. and the Nippon Sekiyu K.K. have decided to drill for oil at Kuchi (phonetic) oil field, co-operating with the East Borneo Co., Ltd. The surveys for drilling for oil will be completed by the end of this year, and the companies will begin operation from March next year. Mr. Nishimura, former engineer of the Kita-Karafuto Kogyo K.K. will start to investigate the field in the near future.

SHIPPING AND SHIPBUILDING

OSAKA SHOSEN KAISHA'S 17-KNOT SHIPS.—Reference was made in our last issue to orders for four cargo ships placed by the Osaka Shosen Kaisha. They will be 445-ft. long with a beam of 60-ft. 6-ins. and a depth of 40-ft. 9-ins., and the two Mitsubishi-Sulzer engines in each ship will develop 7,200 b.h.p. A trial trip speed of 17 knots is called for. These vessels are for transpacific service.—*The Motor Ships.*

O.S.K. LINERS WILL TOUCH AT BELEM.—Starting with the *Manila Maru*, the O.S.K. South American liners will call at Belem, Brazil, after Rio De Janeiro, on their return voyage, it has been tentatively decided by the shipping company. Since this will be simply for the transportation of emigrants from Japan to the Nanbei Takushoku Kaisha, it will cease when the number of colonists bound to this Brazilian Port is too small to warrant the service, it is stated by the Tokyo office of the shipping company.

The O.S.K. South American service will be greatly improved soon when the new motorships *Rio De Janeiro Maru* and *Buenos Aires Maru* of 9,400 tons gross and a speed of 14 knots, are placed on this run. The two sister ships, which are now under construction at the Mitsubishi Yard, Nagasaki will be completed in November and April respectively. The *Rio De Janeiro Maru* will leave Yokohama on November 14.

DIESEL SHIP CONSTRUCTION ACTIVE IN JAPAN.—The ships under construction at the end of July at the shipyards throughout Japan totalled 38, with 182,035 tons, according to the Communication Office. The vessels launched during July totalled 3, with 3,800 tons, making a total of 48, with 102,309 tons since January 1, 1929.

Only one vessel, representing 233 tons, was completed in July, and the total number of ships, the construction work of which has been completed since January 1, was 43, with 52,939 tons.

After a long spell of prosperity, the shipbuilding industry in Japan now shows a declining tendency, unfavourably influenced by the retrenchment policy of the Hamaguchi Cabinet, and no more negotiations for construction are being carried on. However, the shipbuilding industry during July was somewhat active as compared with June. The ships under construction for January numbered 50, with 156,061 tons; those for February, 49, with 159,705 tons; those for March, 49, with 165, 105 tons; those for April, 49, with 176,455 tons; those for May, 42, with 173,724 tons, and those for June 36, with 181,345 tons. The construction of Diesel boats was still very popular, and the greater part of the ships, under construction in July were motorships.

DUTCH LINE'S NEW FLAGSHIP FOR EAST INDIAN TRADE.—There has recently been launched from a Rotterdam shipyard the twin-screw passenger motor vessel *Butoerun*, of 17,000 tons gross register, for the Rotterdam Lloyd Mail service to Batavia. The vessel, which is to be followed by a sister ship named *Dempo*, is of 574¼ ft. in length and 70-ft. breadth; from keel to navigating bridge the height is 82 feet. Great care has been paid to the design not only of the under-water portion, but of the above-water portion and superstructures as well, and she promises to have a characteristic appearance when completed, the short elliptical funnel of 36 feet height and 33 feet by 18 feet diameter adding to this effect.

The cellular double bottom extends right fore and aft and seven watertight bulkheads divide the ship in eight compartments. Sixteen lifeboats, an emergency boat and a motor launch will be carried under Columbus patent davits. Interesting navigational aids include gyro-compass, radio direction-finder, submarine signalling apparatus, etc., in addition to a very complete and up-to-date radio equipment. Cargo spaces have a total capacity of about 300,000 cubic feet, and for the handling of cargo eight electric deck cranes will be installed. Accommodation for passengers and crew has been carefully laid out on eight decks, the maximum number provided for being 238 first class, 230 second class, 170 third class, and a number of fourth-class passengers (troops), with 330 crew.

All first-class accommodation is in deck cabins, none of which touch the skin of the vessel, and consists of two suites de luxe, 12 cabins with private bathrooms, 64 other two berth cabins, and no less than 82 one-berth cabins. Except where technical requirements prevented the fitting of communication doors all cabins are connected by doors, and each cabin has a washstand with running water, lockers, desk or toilet table, and electric stove.

Spacious stairways and two electric passenger elevators from the connection between the promenade deck and first-class dining room, of 3,800 square feet floor area, and seating accommodation for 230. The first-class smoke and music room will have a floor area of 4,100 square feet, the reading room has an area of 550 square

THE FAR EASTERN REVIEW

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遠東時報

Direct Purchasing of Materials by Chinese Railways

FOREWORD: Each year, despite civil warfare and governmental chaos, the trade of China registers a marked increase. On the other hand, old-established foreign firms who laid the foundation of this trade and built it up to its present splendid proportions, are not profiting by this steady expansion. In fact, many have been forced out of business, some are deeply in debt while others are being carried by the banks. It is true that a number of these business disasters are directly traceable to the failure of successive Chinese Governments to pay their debts, but even this cannot be stretched to explain the general downward trend in the fortunes of foreign commercial concerns. There is only one explanation for this phenomena. The Chinese purchaser, financed by his own banks, is more and more entering into direct relationship with the foreign manufacturer, eliminating the foreign middleman in China and the old compradore system. The concentration of the wealth of China in the Treaty Ports has swollen the deposits and assets of the Chinese banks, many of whom have established relations with the most powerful financial institutions in America and Europe. Their guarantee for the payment of the ordinary commercial bill of goods is as sound and acceptable as that of many foreign banks operating in China. It is only natural, that the foreign banks, in order to compete and hold their business, must, wherever possible, extend credits direct to responsible Chinese buyers and guarantee their payments for direct purchases.

THE announcement that Mr. J. K. Choy, Chief of the Administration Department of the Nationalist Ministry of Railways has been instructed to open a Purchasing Agency in London, is indicative of a new policy inaugurated by Minister Sun Fo to cut down expenses by eliminating the middleman in China and purchasing direct from the manufacturers. As Mr. Choy is in London on a mission connected with the use of the British Boxer Indemnity Funds for new railway construction, this step is undoubtedly intended to constitute a guarantee to the British authorities that the utmost economy will be practiced in the expenditure of any funds released for that purpose. It is a further assurance that full and free competition will be offered to British manufacturers of railway rolling stock and accessories and, everything being equal, tenders will be awarded to the lowest bidder.

The step taken by Minister Sun Fo follows a similar decision arrived at by the Mukden authorities, who some months ago officially advised interested parties that it would inaugurate a system of direct purchasing from railway equipment manufacturers in the United States. The new régime in Mukden feels that in the past, quotations have been made by local agents which necessarily included bonuses (polite term for "squeeze") to railway officials directly concerned with the purchasing of equipment. They pointed out that an earnest effort is being made at this time to eliminate these confidential emoluments and consequently desire for the time being to deal direct with American manufacturers.

Mukden's program is, that all purchases will be made against irrevocable letters of credit and the shipments made c.i.f. Dairen; the Chinese railway authorities taking charge of the shipment at the port of entry and satisfying the existing regulations and procedure necessary for importing the equipment. The Mukden authorities state, in effect, that in the past their purchasing field has been circumscribed and limited to a choice of those comparatively few American railway material manufacturers having agents in China, and that this system, has deprived them of that free scope of competition essential to economy. The attitude of the Mukden authorities is important, inasmuch as their purchasing covers nine Chinese operated railways; lines now in their infancy and capable of great extension and expansion. This new policy of the Chinese Railway authorities in Nanking and Mukden affecting as it does the business of every engineering firm in China, although now in its initial and formative stage, is a contingency that must be reckoned with. The tendency of both governments towards concentrating all purchases under one agency and financing their own orders whenever possible is traceable to a desire to seek a wider competition than now seems possible by restricting their purchases through the manufacturers actually represented in China. Although the placing of such orders direct with the manufacturer through an official purchasing office located in London or New York, will operate to the disadvantage of local engineering firms, it can be seen how it will prove of inestimable value to the Chinese Government, when the time arrives to solicit foreign financial assistance in the construction and equipment of a new system of state railways.

In the past, China has paid to the banks issuing her railway loans, a flat five per cent. purchasing commission on all material purchased abroad. This additional perquisite to the bankers was equivalent to an extra 2½ per cent. on the entire loan, a very handsome payment for services which could be performed for about one half of one per cent. Without going into the details and history of how this five per cent. purchasing commission originated, it is sufficient to point out that the Chinese themselves created the precedent on the old Imperial Railways of North China (Peking-Mukden Line) by entering into a contract with a firm of London engineers to purchase all its requirements in Great Britain. The original loan agreement for the above railway made no provision for a purchasing commission. It was a clean cut financial transaction in which because of the international politics involved, the Chinese Government was conceded terms lower than it could have received had the loan been contracted on a business basis. The British and Chinese Corporation simply exacted for the proper execution of the loan contract and supervision over the operation of the line, that they should appoint the Chief Engineer. After the Chinese authorities laid this extra burden on the line, the British banking group requested that in all fairness it should be paid the same commission for performing the same service in subsequent railway loan agreements. The precedent once established, became recognized as a permanent and legitimate charge on subsequent lines and a source of profit to the bankers of all other countries advancing funds for Chinese railway construction. The Chinese, on many occasions

have pointed to this purchasing commission as an instance of how they have been unfairly treated by international finance and as their authorities have never confessed to their own shortsightedness, this impression has been permitted to take root and grow, until now it is commonly accepted by the Chinese as one of the most flagrant abuses on the part of "foreign financial imperialism."

That a five per cent. purchasing commission is somewhat excessive is true; that is all that can be said against it. But it is well to remember that it was never demanded or imposed by the foreign bankers as a condition to a loan agreement until the Chinese themselves created a precedent they were quite willing to follow in all subsequent loan transactions. Times and conditions have changed. Future railway loan agreements entered into between the Chinese Government and responsible groups of foreign bankers, will be devoid of international politics and negotiated as a clean-cut business proposition. The banking group, acting on behalf of its prospective bondholders, will insist upon the strictest economy in construction, in order to reduce the capital outlay to a minimum. There will be no provision or room for "squeeze" or any other diversion of loan funds into the pockets of favored officials or, for undue profits to the bankers or their friends. There will be no purchasing commission set aside for the bankers or for any firm designated to act for them as such.

The Chinese Ministry of Railways will insist upon the right to make its own purchases in the open market. To obtain the fullest and freest competition and rock-bottom c.i.f. prices, the tenders may be advertised in London and New York, so that every approved railway material manufacturer in the country furnishing the loan, will enjoy an equal opportunity to compete.

The establishment at this time of a Chinese Government Railway Purchasing Agency in New York or London, while premature, can only be taken as an indication that the Railway Ministry is strengthening its credit position and paving the way towards the elimination of any future purchasing commission in loan transactions.

The question of how and where purchases of materials are to be made, will undoubtedly become a matter of negotiation and, if the loan is raised exclusively in one country and provision made for preference to the materials of that country, the establishment of a purchasing office in its capital will be stipulated as part of the bargain. On the other hand, if the loan is contracted through an international group of bankers, tenders will be invited in China.

Viewed from this angle, the opening of a purchasing agency in London has much to commend it, notwithstanding that there exists strong and convincing arguments why all the purchasing should be concentrated under control of the Central Purchasing Office of the Ministry of Railways in China. The wisdom of such a step depends solely upon the conditions of the loan agreement and whether or not preference in supplying materials is given to the nation furnishing the funds. In the present instance, where it is hoped that a portion of the British Boxer Indemnity will be used for new railway construction or rehabilitation, the materials should all be purchased as a matter of equity from British manufacturers, and an assurance given beforehand that they will be conceded equal treatment. The old purchasing system aroused considerable opposition and protests from British manufacturers who, rightly or wrongly, felt that they were being discriminated against in favor of a few preferred concerns represented in China by the firm closely allied with the official Purchasing Agents. Although there was little basis for this dissatisfaction, the conditions which gave rise to it have long since disappeared. To obviate any further cause for protests, it is not unwise at this time for the Ministry of Railways to provide some guarantee that if any portion of the Boxer Indemnity is allocated for railway construction, all British equipment manufacturers, irrespective of whether or not they maintain offices or agencies in China, will be given the fullest opportunity to compete. At the same time it is an assurance that the strictest economy will prevail in the expenditure of the funds.

On the other hand, until the Chinese Government's finances are on a more solid basis, with its credit fully re-established abroad, it would be impractical and unwise to purchase direct from the manufacturer. It may be some years before this ideal stage is reached; until then, the practice of inviting tenders in China where proper guarantees for financing the orders are available, is the most judicious course to pursue.

It is possible that the Mukden authorities, operating independently of Nanking, may have the ready funds to make cash payments for materials on their delivery alongside the steamer in Europe or America, but even this procedure is not to be commended, unless the materials have been properly inspected and accepted by an agent of the government before shipment and payment. No matter how much is said for this system as a business proposition, it only tends to complicate and confuse the general political situation and make for a loss of prestige of the Central Government and its Ministry of Railways. If the Chinese nation is now unified and Mukden acknowledges the supremacy of the Central Government, any independent railway activities, either in purchasing for or in the construction of state railways implies that this allegiance is a fiction. There is every evidence to support the statement that Mukden while professing allegiance to Nanking, considers itself autonomous, if not independent, when it comes to negotiating loans for new railway construction or the financing of large orders for its railway requirements. As long as the Mukden Government can pay cash, there can be no objection to direct dealing with American manufacturers, but when the question of its credit is involved and its bonds or notes are offered in payment, the transaction is fraught with grave risks. In fact, these notes or bonds could not be offered for sale on the open market in Europe or America without automatically inviting the official opposition of the various Governments signatories to the Consortium Agreement. For any of these governments to sanction or approve of the issuing of such provincial obligations on their respective financial markets, is equivalent to recognizing the political independence of the provinces.

Direct purchasing may have its advantages where the various railway administrations have the cash or can provide irrevocable letters of credit to guarantee the terms of payment to the manufacturers. In the latter case, it is simply a question of whether a responsible bank is willing to finance the railway administration or provincial government, in preference to a commercial firm. If no long time credits are involved, there are many banks who would be willing to finance these direct orders and make the profit that would otherwise accrue to the middleman. There is increasing evidence that some foreign banks are willing to underwrite such direct financing of orders for materials and assume the risk themselves, rather than lose a profitable piece of business that might go to a competitor financing the middleman. Once the banks enter into competition for this business and accept the guarantees of the Chinese purchasers of materials, the way is opened for the gradual elimination of the commercial engineering firm representing the manufacturers in China. It is quite apparent that some of the larger Chinese banking institutions have created a situation that compels the foreign banks to follow the same methods or lose business. This competition between the banks resulting from the remarkable growth in the past decade of native financial institutions, may, in the end, revolutionize time honored methods of conducting business in China.

This tendency is to be regretted, as after all, the present system with all its drawbacks, has been evolved by a century of trading as the only safe way of doing business in China; the only guarantee that the interests of both manufacturer and customer will be adequately safeguarded. But, in the keen competition for orders and profits, with the world to shop in and check up on quotations, the Chinese will always have the advantage if they can provide the necessary banking guarantees and facilities for payments and are willing to assume the risks involved in shipping, landing and delivery of the merchandise.

If the Chinese railway authorities or industrialists can obtain the financial support and guarantees of responsible Chinese banks in placing orders direct with the foreign manufacturer and accepts before shipment the okay of some reputable firm of consulting or inspecting engineers that the material conforms to specifications and is then willing to assume all the risks attendant upon delivery assembling and erection of the plant at the port of destination in China, few foreign manufacturers will decline the business. His responsibility ends with delivery of the merchandise alongside the steamer. But, no reliable manufacturer of engineering plant or railway equipment who hopes to establish a permanent business in China could afford at this juncture, to accept any important engineering contract that does not carry with it, assembling or erection of the plant by their own expert engineers and some provision or guarantee for its efficient operation over a stated period of time. This calls for service that can only be rendered by maintaining an office or an agency in China.

G.B.R.

Engineering Notes

ELECTRIC LIGHT, POWER AND TRACTION

HYDRO-ELECTRIC PLANT MANILA.—Construction work is well under way on the new hydro-electric development project to be built in the Philippine Islands, by the Manila Electric Company.

This waterpower project will have a head of 633 feet and be located on the Bogotan River about fifty miles from the City of Manila. Current will be transmitted over a steel tower transmission line at a voltage of 110,000, which will be the highest voltage in the entire Orient. The initial capacity will be 25,000 horsepower the waterwheel generators being rated at 720 revolutions per minute, which will be the highest speed generators of that size ever built, the usual speed being 600 revolutions per minute. The power to be generated at this plant will take care of the major portion of the electric requirements of the City of Manila and the adjacent and intervening territory and will be augmented by steam generated power at peak loads.

YAWATA IRON WORKS, STEAM POWER STATION.—As the present capacity of the company's power stations is not enough to meet the requirements, it has been decided to build a 20,000 kw. steam power station next year. It is reported that the equipment will probably be ordered from Japanese makers.

THE KOREA HYDRO-ELECTRIC POWER COMPANY.—The Toho Denryoku K.K. and its interested concerns have applied to the authorities to establish the Chosen Suiryoku K.K. (The Korea Water Power Co., Ltd.) with a capital of Y.50,000,000. According to the plans, the company will build five hydro power plants on the Kwanko River and two hydro power plants on the Kinko River; total capacity 200,000 kw. A 3,500 kw. steam power plant will also be built between Fuzan and Taiden. The total estimated cost of construction is about Y.90,000,000. The electric light and power is to be supplied to Kogendo, Zenrahokudo, Zenrandō, Chuseinandō and Chuseihokudo prefectures.

PYKARA HYDRO-ELECTRIC SCHEME IN INDIA.—The chief engineer for hydro-electric development of the Government of Madras, Maj. H. G. Howard, Madras, India, has recently submitted estimates for a program of hydro-electric development for the supply of electricity to the Nilgiris district and neighboring towns of Coimbatore, Madura, Dindigul, and Trichinopoly. The scheme also includes the electrification of the railways in this district. Several alternate programs have been prepared. The estimates of the cost vary from about $10,000,000 to $25,000,000, depending on the scheme selected. The proposed development will be one of the largest in the world.

TRAMWAY MOTORS FOR NEW ZEALAND.—The General Electric Company, Limited, Magnet House, London, has received an order from the Auckland Transport Board for 104 Tramway Motors, each rated at 40 b.h.p. 500 volts, on the one-hour rating. The motors will be of the G.E.C. standard self-ventilated interpole type (Oerlikon system), and will be fitted with roller type armature bearings. The order also includes the supply of resistances, lightning arresters, etc.

TAIWAN ELECTRIC POWER CO., LTD.—The Taiwan Denryoku K.K. has ordered four units of outdoor transformers of 500 kva. 60 Cycle, 3,300-2,200 V, single phase, automatic cooling, one unit automatic regulator of 120 kva. 3 phase and some distributing boards from the Shibaura Engineering Works.

UJIGAWA ELECTRIC COMPANY.—Plans are being prepared for the extension of the Ujigawa Electric Company's power station at Kizu-gawa. Three additional 35,000-kW. generators will be installed, bringing the capacity of the station up to 165,000 kW. These additions will make the capacity of the Kizu-gawa station greater than that of any other in the country.

The Central Government is being approached with regard to the proposed extension of power plant of the Yamaguchi Prefectural Authorities. The scheme includes the installation of a 45,000-kw. generator, and its total cost is estimated at about Y.8,000,000.

ELECTRIC LIGHT EXTENSION, GALLE.—Work in connection with the extension of the Galle Electric Lighting Scheme has been completed at a cost of Rs. 111,000. A new Power House equipped with two generator sets each consisting of a 110 kW. alternator driven by a 200 h.p. oil engine has been built adjoining the old one. With these it is expected that it will be possible to negotiate a load equivalent to 25,000 lamps of 20 watts each.

RAILWAYS

NOVEL STEAM CARS UNDER CONSTRUCTION IN KOREA.—It is reported that two steam cars with capacity for 64 passengers now under construction in the railway shops in Shin-Ryuzan at an estimated cost of Y.9,000 each will be completed this month put on the run between Keijo and Chemulpo and Riri and Kunsan. It is said they can develop a speed of 35 miles per hour. The cars measure 59 feet in length, the front being for the engine, the center for passengers, and the rear for the conductor's room.

THE KIRIN-TUNGKIANG LINE.—The proposed line is to run about 500 miles up northeast to Tungkiang at the convergence of the Sungari with the Amur.

Though the Kirin-Tungpin section has already been completely surveyed, a separate surveyors' party, including five engineers with 10 men, is to be organized to take up the survey work beyond under Chief Engineer Chang Kou-hsien.

The new line is to run through 10 Prefectures of Kirin, Shuhsu, Yushu, Wuchang, Tungpin, Fangcheng, Han, Fuchin, Huachuan, and Tungkiang.

The latest scheme is to connect by rail Muling Station on the C.E.R. Eastern Section with Mishan, northeast thereof on the Siberian frontiers, about 100 miles distant.

NEW RAILWAY LINE AT SINGAPORE.—The proposals for the deviation of a portion of the railway on Singapore Island and the provision of a new terminal station in Singapore are now complete, and arrangements are being made to commence the work.

The deviation will start from a point near Bukit Timah, and the new line will run in a westerly direction to Tanjong Pagar, where a large and modern station is to be built on land formerly owned by the Harbor Board.

The present line from Bukit Timah to Tank Road and from Tank Road to the Tanjong Pagar goods station will, it is understood, be taken up, but more particulars will be available later.

KANHOKU LINE OF CHOSEN RAILWAY CO.—The Kanhoku line of the Chosen Railway Company between Shinten and Mosan, a distance of 15.1 miles, with a freight line of 1.2 from miles Mosan to the River Tuman opened on November 15, and it is expected that timber rafted down the Tumen will be beached at Mosan for distribution throughout the country.

NEW CHINESE LINES IN MANCHURIA AND INNER MONGOLIA.—Regarding the Tsitsihar-Koshan line; for which a public loan is being floated, the rails have been laid up to Koshan, and the line will be opened to traffic by January next.

As regards the Saufangtai-Wangkuei branch line to the Hulan-Hailun line, the Hulan-Hailun line people are carrying on the surveys on a concrete plan mapped out thereby, and work will be started on the return of spring.

Regarding the Kirin-Tungkiang line *via* Wuchang, Imienpo, Sansing, and Fuchin, over 2,000 Chinese "li" in length, work will be commenced in autumn next year.

The plans for other lines such as one between Payen and Holikang along the Sungari in Heilungkiang Province, the Anda-Paichuan line, and the Taonan-Solun line are also being pushed forward.

LUNGHAI AND CANTON-HANKOW LINES.—A special committee to supervise the completion of the Sun-Lungpao section of the Lunghai Railway has been appointed by the Ministry of Railways, with Kwan Kan-lun as the Chairman. Construction work is expected to be started immediately after the inauguration of the Committee, as surveying of the territory to be traversed by the projected extension has already been concluded. It is also learned at the Ministry that the construction of the Chuchow-Shiuchow section of the Canton-Hankow Railway will be started next month. Part of the required expenses amounting to $450,000 has been remitted to the Ministry by the Canton-Hankow Railway Administration.

LINE TO CONNECT CHANGCHUN AND KWANCHENGTSU STATIONS.—The railway to be built between the Kwanchengtzu station on the Chinese Eastern Railway and the Changchun station on the Kirin-Changchun line is not a light railway as reported, but will be a Russian standard gauge line.

The work was started at the beginning of November and is expected to be finished in December. The entire distance is 6½ kilometres, which will be of a provisional nature.

It is ascertained that the Chinese authorities decided to push the work on this line made inevitable by military reasons, because the South Manchuria Railway flatly refused to allow the passage of Chinese troops through their railway zone on account of the neutral attitude maintained by Japan, and consequently experienced great inconvenience in sending reinforcements to the northern frontier regions.

INDUSTRIAL

ONODA CEMENT CO. TO ERECT BRANCH FACTORY AT ANSHAN.—The Onoda Cement Co. running a factory at Choushuitzu near the Railway station next Dairen, is going to found a branch factory at Anshan, the seat of the Iron and Steel Works. The new plant is to be capable of turning out 100,000 barrels of cement.

The Onoda Company has purchased the central cement factory at Yawata, the seat of the Government Steel Works, Edamitsu.

KAWAKITA ELECTRIC WORKS TO BUY OKUMURA'S FACTORY.—The Kawakita Electric Works has decided to take over the Okumura Electrical Machinery Company's factory in Kyoto, which came into possession of the 15th Bank in a recent auction. The cost of buying is Y.1,900,000.

After buying the factory, the Kawakita Works will concentrate its energy in Kyoto, moving all the equipment in its Osaka factory, and this is expected to be completed within a year.

Volume XXVI

January 1930
W. B. Poland A biographical sketch of this American railway financial adviser, who as a member of the Kemmerer Commissioner , had spent a year studying China's financial problems with railways. Poland's report was due to be published.
Railway Enterprise Under the National Government. A five-page editorial summarizing the work of the Ministry of Railways since its formation. 1 portrait of Sun Fo.
Engineering Notes:
Diesel Locomotives for S.M.R. Two diesel locomotives had been ordered, one from Sulzer and the other from M.A.N.
New Chinese Lines in Manchuria Update on the progress of new lines which had been postponed because of Chinese – Soviet Russian difficulties.

February 1930
Mantell on the Nanking-Shanghai Railway J. J. Mantell, an American adviser retained by Sun Fo, Minister of Railways, had heavily criticised the management of the railway which was in the hands of the British & Chinese Corporation. The corporation had been profiteering in the supply of railway materials.
Engineering Notes:
New Hsiachiutai-Yaomen Line The Governor of Kirin had ordered that this line should be built.
Canton-Hankow Line It had been announced that construction of the uncompleted section would commence the following year making use of a new ''Reorganization'' loan.
New Wharves to be Given Shanghai An extension of the Shanghai-Nanking was planned to serve new wharves near Woosung.
Hulutao Harbor Report that construction of an expanded Hulutao harbour facility was being considered by various ministries including the Finance & Railways Ministry.

March 1930
The Hulutao Port Development Project An expanded description of the proposed new Hulutao port facility, mentioned in the February edition.
Engineering Notes:
Branch Railway for Chinkiang A short branch line from Chinkiang (*Zhenjiang* 镇江) station to the Customs House was to be builtt & funded by the Shanghai-Nanking Railway.

April 1930
New Chinese Eastern Railway Bridge Over the Sungari An illustrated article about new and replacement bridges in Bangkok, Japan and also Manchuria. The CER had earlier replaced a railway bridge at Laoshaogow on the southern branch line and had now invited tenders for a new replacement bridge at Harbin.
Electric Mining Locomotive for China An illustrated description of an 18-inch gauge electric mining locomotive manufactured by Greenwood & Bailey of UK for an unspecified Chinese Mining Company. I photo.
Publishers' Announcement The editor announces that beginning with this issue the magazines would henceforth include "The Asiatic Marine Review" section, devoted to shipping matters in the Far East. There are many well-

illustrated descriptions of new ships built (mainly in Japan) for the Asian markets. Railway receive less attention from this point on.
Engineering Notes:
Light Railway for Ashiho The local gentry of Ashiho (Acheng 阿成) near Harbin had undertaken to build a light railway of 28 miles length to connect with Lalin (拉林).
New Locomotive for South Manchurian Railway Repeat report about a diesel locomotive ordered from Sulzer Brothers (see January edition).
Another New Railway The 204 km Tsitsihar-Keshan (克山) Line would soon be added to the railway system of the Three Eastern Provinces.
Railway Workshop for Mukden A new large railway workshop was planned for Shenyang.
The New Tsitsihar-Koshan Line (a.k.a Keshan) Passenger and goods traffic had opened as far as Taianchen (泰安镇 ?)
To Construct Shiuchow-Pingshek Section of Canton-Hankow Line Surveying of this section had been completed and work would begin on the line.
Kirin-Hailung Railway Construction had been completed on the 300km line.
Tsitsihar-Heiho (黑河) Railway Merchants had petitioned the authorities to issue a loan for building the line.

May 1930
The British Boxer Indemnity and the Railways of China A report praising the decision to allocate two thirds of the indemnity fund for railway purposes.

June 1930
No reports about Chinese railways

July 1930
Poor Shensi An editorial about the famine sweeping through China's northern provinces and in particular Shensi and Suiyuan, where millions were dying of starvation and disease. Efforts by the American Red cross to bring relief had failed because of the breakdown of law and order under corrupt war lords. (Note: Although not railway related, the main line rail heads are mentioned. I have included this report because it describes the appalling political situation and corruption in China in this era).
New Coal Pier for South Manchuria Railway Company Report describing a new branch line and coal-loading pier which had been built at Kanchingtsu (甘井子 *Ganjingzi*) near Dairen. 4 photographs.
New 500-ton Anshan Blast Furnace Description of new steel plant at Anshan. Includes a photo showing railway tracks serving the facility.
Engineering Notes:
New Manchurian Railways A brief description of three new lines proposed for construction. An application for approval had been submitted to the Nanking Railway Department.

August 1930
Chekiang Development Program The local Chekiang government had drawn up extensive development proposals for the region. Several maps are shown including one showing existing and proposed railway construction in the province.

September 1930
The Chinese Eastern Railway A long editorial discussing rumours circulating about the railway being sold to American financiers and how the Chinese were still trying to reclaim the line by purchasing Russian assets.
Conservancy Works in China Editorial describing how the development of Hulutao as a “great new port” as part of Sun Yat-sen’s railway development scheme. 1 sketch map showing railways.
The Standard Stoker Company Advertisement for locomotive automatic coal stokers.

October 1930
The British Boxer Indemnity Editorial about the use of indemnity funds for railway rehabilitation in China.

November 1930
Development of Modern Banks in China. Photo portraits of Chang Kia Ngau (张嘉璈) & Dr. H. L. Huang (黃漢樑), Vice Minister of Railways

December 1930
Nanking-Pukow Train Ferry Illustrated description of the proposed train ferry and loading dock for a train ferry across the Yangtze River between Nanking and Pukow, thus linking the Shanghai-Nanking and Tientsin-Pukow Railway lines.
Diesel Locomotives for S.M.R. Report that the S.M.R had sent engineers to Germany in connection with their purchase of diesel railway engines.

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H.E. MINISTER OBATA

CHIANG I(AI-SHEI(ON THE STATE OF CHINA

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SIR HARRY FOX

CI-IINA AND THE HEALTH OF THE WORLD

Vol. XXVI January, 1930 No. 1

SHANGHAI, PEKING, TOKYO AND MANILA

W. B. Poland

Railway Finance Advisor

ELSEWHERE in this issue will be found the very interesting report of the work of the Ministry of Railways, which is so fundamental in the reconstruction of China. In connection with this report attention should be called to the valuable services of Mr. W. B. Poland, a member of the Kemmerer Commission, who was especially designated as an expert on railway finances and who has spent almost a year studying the very intricate problem of railway finances in China, with the special objective of the economic rehabilitation of China's railways.

It is impossible at this time to refer to Mr. Poland's report because the reports and recommendations of the commission of Financial Experts will not be made public until they have been translated into Chinese and that has not yet been done. Nevertheless, it is undoubtedly correct to assume that Mr. Poland has indicated two general lines in his recommendation :

1. It will be impossible to find financing in foreign countries, particularly in the United States, for China's railways, until China has met her outstanding defaulted obligations, which as regards the railroads amount to between $60,000,000 and $70,000,000. It is understood that Mr. Poland has worked out a complete and feasible plan for the liquidation of these outstanding obligations.

2. It is understood that Mr. Poland has proposed as a basic formula that before any new work is undertaken, the existing railways of the country must be rehabilitated. Practically no replacements have been made in China's railways during the past six years and with regard to some railways nothing has been done for 10 years, which means that the lines are in a terrible condition and that unless something is done very soon, some of them may die.

Mr. W. B. Poland

Underlining both these recommendations is the fundamental one that political conditions in China must be stabilized, that civil wars must stop before anything can be done to rehabilitate the lines. All the railways of the country must be placed under the single authority of the Ministry of Railways and provision must be made to protect the railways from the unlawful seizure by militarists. Even at this moment several of the railways in North China are not operating because of military interference and the funds of these lines are being held by military satraps to finance civil war. It is impossible for Mr. Poland's proposals or for any plans of the Ministry of Railways to be fully effective as long as military men are able to interfere with the authority of the Ministry of Railways and as long as general political conditions in China continue to be unstable. Until Mr. Poland's report is published, it is impossible to discuss his recommendations intelligently, but enough is known of Mr. Poland's work elsewhere and of his general attitude while he was in China to believe that he has contributed invaluably to the economics of China's railways and that his work here when it is fully known will be appreciated by the Chinese people.

W. B. Poland was born at West Point, New York, son of General J. S. Poland. He was graduated from the Massachusetts Institute of Technology and was awarded an advanced engineering course. He served as engineer in the United States River and Harbor Service and was in charge of engineering and construction at Point Judith Harbor Refuge and other river and harbor works. He also served in the Spanish-American war, after which he was detailed on engineering work under General Goethals. In 1904 he became the general-manager and chief-engineer of the Alaska Central Railway, the line which was afterwards completed by the United States Government. From 1907-1913 he was Vice President and Chief Engineer of the Philippine Railway Company.

It was during the Great War that Mr. Poland came into the closest contact with President Hoover. From 1914 to 1918 he became Director in Belgium and Director for Europe of the Commission for Relief in Belgium and France. In 1919 he was the Engineer and Manager of the American Military Mission to Asia Minor and Trans-Caucasus under General Harbord. During 1920 and 1921 he was joint liquidator for the Commission for Relief in Belgium, closing the $923,000,000 of operations. From 1922 to 1925, he was Director of Railways and Port construction in Yugoslavia. From 1926 to 1928 he was Director-General of Railways for the Imperial Government of Persia.

The above sketch of Mr. Poland's career is neither complete nor does it adequately do him justice. His work has always been of the constructive character and it is particularly fortunate that China has been able to utilize the services of such a man at this, the beginning of its reconstructive era.

Kokusai Kisen Invites Bids For Three New Ships

The Kokusai Kisen Kaisha has definitely decided to construct three 9,500-ton class Diesel ships. The Yokohama Dockyard, the Uraga Dockyard and several other shipbuilders were asked by the Company to make their bids. As regards the engines to be installed in these ships, either the solid injection M.A.N. or Burmeister & Wain types will be selected.

To cover the construction cost of these new ships, the Kokusai Kisen Kaisha sometime ago sold its old fleet consisting of some 130,000 tons. The Government's announcement of the exact time for lifting of gold export ban induced the Company immediately to invite the bids.

Railway Enterprise Under the National Government

(A resume of the work of the Ministry of Railways since its establishment)

[The following official report of the accomplishment of the Ministry of Railways since its inception will shortly be issued by the Ministry of which Mr. Sun Fo is the Minister. Comment is superfluous as the report speaks for itself.—ED.].

I. A Brief History of the Ministry of Railways

Dr. Sun Yat-sen said "Transportation is the key to Industries and Railway the key to Transportation." Verily the Railway is the fundamental instrument of transportation and therefore the foundation of industrial development. That is why Dr. Sun Yat-sun advocated, at the very beginning of the Republic, the construction of a 100,000-mile railway net-work. His advocacy has taught us that without executing the Railway policy, material construction in China will be impossible.

The National Government, acting on Dr. Sun's instruction, established on November 1, 1928, under the Executive Yuan the Ministry of Railways to take charge of the Railways in the Country and to consummate Dr. Sun's plan. Mr. Sun Fo was appointed Minister; Messrs. Lien Sing-hai and Wang Cheng were appointed Political and Administrative Vice-Ministers respectively. On the day of the Ministry's inauguration, it consisted, as provided in the Organic Law promulgated by the National Government, four departments, namely, the Department of General Affairs, the Department of Railways Administration, the Finance Department and the Department of Planning and Construction with Messrs. Chen Yen Chün, J. K. Choy, Wang Cheng and Y. S. Chun as Directors of the respective departments. Messrs. C. S. Liu, T. C. Yen, Kuan Keng Lin and J. Usang Ly were appointed Counsellors.

Having taken over from the Ministry of Communications all duties pertaining to Railways, the Chiaotung University in Shanghai, the Civil Engineering College in Tangshan, the College of Railway Administration in Peiping and a chain of Railway Middle and Primary Schools established in the various Railway Centers for the education of the children of Railway employees; the Ministry set to work. Minister Sun Fo introduced in the Central Political Council of the Kuomintang two Administrative Policies; *i.e.* the Centralization of Railway Administration and the Independence of Railway Accounting System. Having passed these resolutions, the Central Political Council ordered the Ministries of War and Railways to execute these policies in full. Railway enterprise in China began a new life.

On account of the lack of railway experts in China, Dr. J. A. L. Waddell was retained as Consulting Engineer, Mr. J. J. Mantell as Adviser on Railway Management, Mr. R. S. Norman as Legal Adviser and Mr. Wm. B. Poland as financial Adviser to the Ministry.

To facilitate business transactions, an office of the Ministry was established at Shanghai with Mr. Tiehsan Chen as Director.

Sun Fo, Minister of Railways

So much for organization, let us now come to the administration of the various Railways.

Since Nanking became the National Capital, the political and economic importance of the Nanking-Shanghai and the Shanghai-Hangchow-Ningpo Railways has gradually grown. Mr. J. K. Choy was appointed concurrently to take charge of these administrations.

The Peiping-Mukden and Peiping-Suiyuan Railways, being trunk lines of the North-East, have suffered great damages from internal strife of late. They urgently need rehabilitation. Mr. Wang Cheng was appointed to concurrently take charge of them.

The Lunghai and the Tatung-Chengtu Railways were formerly administered by Directorates-General. Upon the recommendation of the Ministry, the Executive Yuan abolished the above mentioned offices so that the administration of these Railways would be under one head instead of two.

The settlement of the Tsinan Incident called for reorganization of the Kiao-Tsi Railway. Consequently the Kiao-Tsi Railway Managing Commission was established with Dr. T. C. Yen as Chairman of the Commission.

Later, with its head office removed to Peiping, the Hankow-Peiping Railway was renamed as Peiping-Hankow Railway. Mr. W. T. Liu was appointed Managing Director.

Messrs. Pan T'ing-hsien, Sun Ho-kao and Fang Ta-chih were appointed Managing Directors of the Peiping-Suiyuan the Tientsin-Pukow Railways and the Hunan-Hupei Section of the Canton-Hankow Railway respectively.

Then the three Railways in Kwangtung come under the actual control of the Ministry. The Canton-Samsui Railway was amalgamated into the Canton-Hankow Railway with Mr. Chen Yin-wen as Managing Director, while Mr. Liu Chiu-ko was made Managing Director of the Canton-Kowloon Railway.

Upon the request of the Kiangsi Provincial Government, the Ministry took over the administration of the Nanchang-Kiukiang Railway. Mr. Kung Hsueh-shiu was appointed Managing Director.

After the inauguration of the Ministry, the Ministry of Communications, acting on the order of the State Council transferred to the Ministry of Railways all duties pertaining to National Highways. A National Highway Planning Commission was organized with three Commissioners appointed by the Ministry and one representative from each of the Provincial Construction Departments and Mr. Y. S. Chun as Chairman. It completed its task of planning in three months.

The Ministry of Communications also transferred its European office at Paris which served as an organ to arrange for international through traffic. Upon taking charge of this office, the Ministry appointed Mr. K. Y. Woo as Director and concurrently as Delegate to the International Railway Union representing the Peiping-Liaoning, the Peiping-Hankow and the Tientsin-Pukow Railways.

For the classification of goods and the determination of tariffs, the Advisory Committee on Fares, Rates and Classification of Goods was appointed with the Director of the Department of Railway Administration as Chairman of the Committee.

In order to unify the accounting and statistical systems of the various Railways, the Advisory Committee on the Unification of Railway Accounts and Statistics was appointed with the Director of the Finance Department as Chairman.

An Editorial Committee on Railway Rules and Regulations was also appointed. Vice-Minister Lien Sing-hai serves as Chairman.

To eliminate corruption in the purchasing of Railway materials, a Purchasing Commission, a Commission on Selection of Tenders and a Commission on Inspection of Purchased Materials were organized. Later, the three Commissions were amalgamated into the Purchasing Commission with Messrs. Hu Chi-hsien, Tiehsan Chen and Chen Chiu-an as members of the Standing Committee. Three Sub-committees were appointed to Peiping, Hankow and Canton.

For the training of qualified personnel for Railway Service, the improvement of the existing Railway Schools and the education of the low grade staff and laborers now in active service, the Committee on Railway Education was organized with at first Mr. Y. S. Chun and later Mr. Kuan Keng-lin as Chairman.

More than fifty years have elapsed since China first adopted modern means of communication, but no complete and reliable record of the History of Communications is available. Since the organization of a Committee to compile a history of communications under the auspices of the Bureau of Compilation and Translation in the defunct Peking Government in 1922, the history has not been completed although several changes had already taken place. The Ministry, in co-operation with the Ministry of Communications, organized the Committee for Compiling the History of Communications with Mr. Kuan Keng-lin as Chairman and Mr. Chang Hsin-cheng, a division chief of the Ministry of Communications as Editor-in-Chief.

In last September Vice-Minister Wang Cheng resigned on account of poor health. Mr. J. Usang Ly was appointed to succeed him. Meanwhile Mr. Hu Chi-hsien was appointed Director of the Finance Department, Dr. T. C. Yen was transferred to be Chief Technical Expert. Messrs. Liang Han-chau, F. K. Sah and Dr. King Cheng-yang were appointed Counsellors.

Not long after, Mr. J. K. Choy was sent to Europe to study Railway conditions and problems. Mr. F. K. Sah was made acting Director of the Department of Railway Administration and Mr. Hu Chi-hsien was appointed to concurrently take charge of the Administration of the Nanking-Shanghai and Shanghai-Hangchow-Ningpo Railways.

The Peiping-Mukden Railways was renamed as Peiping-Liaoning Railway with Mr. Kao Chi-yi appointed as Managing Director. The unification of administration in the Peiping-Liaoning Railway was effected.

For one year after the establishment of the Ministry, no serious change in organization took place. But being newly established the division of duties inside the Ministry worked more or less on a trial basis. As the Ministry goes on experience calls for reorganization. Therefore, on November 18, the National Government promulgated the revised Organic Law of the Ministry. In the new organization the Ministry is composed of the following departments and bureaus :—

1. The Counsellors's Office
2. The Secretariat
3. The Department of General Affairs, with Mr. Chen Yen-chün as Director.
4. The Department of Traffic and Operation with Mr. Kuan Keng-lin as Acting Director.
5. The Finance Department with Mr. Hu Chi-hsien as Director.
6. The Engineering Department with Mr. F. K. Sah as Director.
7. The Railway Through Traffic Administration with Mr. Kuan Keng-lin as Acting Director.
8. The Bureau of Statistics with Mr. F. K. Mok as Director.
9. The Railway Health Service with Dr. S. M. Woo as Director.

II. Analysis of Principal Duties

TABLE SHOWING THE ORGANIZATION AND WORK OF THE MINISTRY

The Minister
- The Ministerial Conference
- The Political Vice-Minister
- The Administrative Vice-Minister

- THE ADVISORS' OFFICE—Proposing, investigating, examining, and inspecting the plans, construction and management of Railways and National Highways.
- THE COUNSELLORS' OFFICE—Drafting, examining, deliberating on editing and compiling rules, regulations and ministerial orders.
- THE SECRETARIAT—Drafting, deliberating on and safekeeping confidential correspondence, editing and translating administrative reports and documents in foreign languages, keeping records of ministerial conferences, taking care of the Library and the Museum.
- THE DEPARTMENT OF GENERAL AFFAIRS—Attending to the general affairs of the Ministry and its subordinate offices and affairs not specially assigned to other offices, departments and bureaus.
- THE DEPARTMENTS OF TRAFFIC AND OPERATION—Attending to the traffic and operation of Railways and National Highways under the Ministry.
- THE FINANCE DEPARTMENT—Attending to the financial affairs of the Railways and National Highways under the Ministry.
- THE ENGINEERING DEPARTMENT—Attending to the engineering work of the Railways and Highways under the Ministry.
- TEH BUREAU OF RAILWAY STATISTICS—Attending to the statistics of the Ministry and its subordinate offices.
- THE RAILWAY HEALTH SERVICE—Attending to the sanitary and medical affairs of the various Railways.
- THE THROUGH TRAFFIC ADMINISTRATION—Attending to domestic and international through traffic arrangements and the clearing of Railway accounts.
- RAILWAY PLANNING COMMISSION—Planning Railway lines of the whole country.
- NATIONAL HIGHWAY PLANNING COMMISSION—Planning the Construction of National Highways.
- ECONOMIC COMMITTEE—Making economic plans for operating and projected lines.
- EDITORIAL COMMITTEE ON RAILWAY RULES AND REGULATIONS—Drafting, deliberating on and compiling rules and regulations.
- PUBLICITY COMMITTEE—Centralizing publicity and editing official publications and statements.
- TECHNICAL COMMITTEE—Studying and solving technical problems in Railway Engineering.
- COMMITTEE ON STANDARDIZATION OF RAILWAY TECHNIQUE—Determining the standard of and working out improvement on Railway technique.
- PURCHASING COMMISSION—Purchasing materials for the railways.
- ADVISORY COMMITTEE ON THE UNIFICATION OF RAILWAY ACCOUNTS AND STATISTICS—Revising the Accounting Rules and Classifications, working out accounting methods, working out Statistical forms and Regulations, and summarizing other accounts.
- ADVISORY COMMITTEE ON READJUSTMENT OF RAILWAY OBLIGATIONS—Readjusting the various Railways' obligations rising out of domestic and foreign indebtedness.
- COMMITTEE ON RAILWAY PERSONNEL—Investigating the qualification of railway employees.
- COMMITTEE ON RAILWAY EDUCATION—Reforming and improving on Railway education.
- COMMITTEE ON RAILWAY SCHOLARSHIP ABROAD—Determining the number of scholarships and investigating the qualification, examining the standard and experience of scholarship holders and applicants.
- COMMISSION ON SUPPRESSION OF OPIUM SMOKING—Investigating, examining and Suppressing Opium Smoking that may be addicted by Ministerial and Railway staff.
- COMMISSION ON THE COMPLETION OF THE LUNGHAI RAILWAY—Taking charge of the planning, surveying, financing and construction of the unfinished sections of the Lunghai Railway.
- COMMISSION OF THE COMPLETION OF THE CANTON-HANKOW RAILWAY—Taking charge of the planning, surveying, financing and construction of the unfinished section of the Canton-Hankow Railway.
- COMMITTEE FOR COMPILING THE HISTORY OF COMMUNICATIONS—Compiling the History of Communications.
- Other Committees, Commissions and Conferences.
- The Shanghai Office.

A resolution passed by the Second Plenary Session of the Kuomintang Central Executive Committee last Spring appropriated two-thirds of the Boxer Indemnity Funds for Railway construction and decided that the Canton-Hankow Railway should be completed by the end of 1932. Therefore a Commission on the Completion of the Canton-Hankow Railway was established with Mr. Y. S. Chun as Chief Commissioner and Mr. H. S. Chuck as Director of Construction of the Chuchow-Shaochow Section. The same resolution further decided that the Lunghai Railway should be completed by the end of 1934. Therefore a Commission on the Completion of the Lunghai Railway was established with Mr. Kuan Keng-lin as Chief Commissioner, Mr. Ling Hun-hsün as Director of Construction of the Lung-hai Railway and Mr. Ko Kuang-t'ing as Managing Director.

As a compensation to the share holders of the Canton-Shaochow Section of the Canton-Hankow Railway the Ministry has been authorized by the National Government to issue $20,000,000, bonds to redeem the shares outstanding. A Board of Trustees for the Yueh-Han Railway Redemption Bonds was organized.

Other organizations as the Advisory Committee on Railway Terminology and the Advisory Committee on Railway Loan Agreements have come into existence as work demands.

III. The Organization of, and the Distribution of Work in the Ministry

The Ministry of Railways plans, constructs and manages all the state railways and national highways. It supervises all the province-owned and private railways.

The Ministry of Railways is composed of:

The Counsellors' Office
The Secretariat
The Department of General Affairs
The Department of Traffic and Operation
The Finance Department
The Engineering Department
The Through Traffic Administration
The Bureau of Railway Statistics
The Railway Health Service
The Commissions and Committees.

The Counsellors' Office is composed of two Sections, the Legislative Section and the Compilation Section. This office attends to the drafting, deliberation, examination, compilation, editing, and registry of rules, regulations and Ministerial Orders.

The Secretariat is composed of three offices, the Secretarial Office, the Editorial and Translation Office and the Library. The Secretaries attend to the drafting and custody of confidential correspondence, the deliberation of official documents, the editing and translation of official publications, statements, and documents, and the records of the Ministerial Conferences.

The Department of General Affairs is composed of the Business Division, the Division of Documents and archives, the Division of Education and the Personnel Division. This Department attends to:—

1. The receiving, despatching,distribution, drafting and safekeeping of documents.
2. The issuance of Ministerial Orders.
3. The custody of the Ministerial Seals.
4. The appointment, dismissal, reward, and punishment of the staff of the Ministry and the staff of the officers under the Ministry.
5. The compilation of administrative reports.
6. The training and education of executive and technical personnel for for the Railway service.
7. The education of Railway employees and the administration of Railway schools.
8. The Ministerial estimates, budgets, accounting and miscellaneous affairs.
9. The affairs not especially assigned to other offices, departments, bureaus, committees or commissions.

The Department of Traffic and Operation is composed of the Traffic Division, the Operation Division and the Labor Division. This Department attends to:—

1. The supervision, management, improvement and development of the traffic business of the Railways.
2. The management and control of Railway operation and the rolling stocks.
3. The determination of fares and rates.
4. The domestic and international through traffic arrangements.
5. The approval of traffic equipments.
6. The working condition and protection of Railway employees.
7. The training and control of Railway police.
8. The adoption of plague-preventive and other sanitary methods in the Railways.
9. The supervision of the province-owned and private Railways.
10. International Railway problems.
11. The operation and traffic of national highways.

The Finance Department is composed of the Division of Financial affair, the Division of Audits and Accounts, the Division of Railway Obligations and the Division of Investigation. This Department attends to:—

1. The drawing up and checking of Railway estimates and budgets.
2. The control and safekeeping of Railway funds.
3. Raising funds for rehabilitation and construction of Railways.
4. The readjustment and repayment of Railway loans and obligations.
5. The auditing of Railway accounts and bills.
6. Railway accounting system and statistics.
7. The management of Railway properties.
8. The purchase and management of Railway land.
9. The economic planning and investigation of Railways.
10. The supervision of the finance of the province-owned and private Railways.
11. Other financial affairs of the Railways.
12. The financial affairs of national highways.

The Engineering Department is composed of the Division of Civil Engineering, the Division of Mechanical Engineering and the Planning Division. This Department attends to:—

1. The supervision, management and rehabilitation of engineering affairs in the Railways.
2. The Location of Railway lines and the planning of Railway engineering.
3. The supervision and management of the engineering work in Railway construction.
4. The construction of Railway terminus and municipal construction in the Railway zones.
5. The examination in materials for civil and mechanical engineering in the construction of Railways.
6. The construction and management of Railway shops and stores.
7. The supervision of the engineering work in the province-owned and private Railways.
8. Other engineering work in the Railways.
9. Engineering work in the national highways.

In the Ministry of Railways, there shall be one Minister, one Political Vice-Minister, one Administrative Vice-Minister, two to four Counsellors, four to eight Secretaries, four Department Directors, twelve Division Chiefs, one hundred twenty to one hundred sixty clerks, one Chief Technical Expert, sixteen to twenty Technical Experts, twenty to thirty Junior Technical Experts and twenty to twenty-four Technical Assistants.

For the planning of the National Railway Network, the national highway system, the unification of Railway accounting system, the compilation of Railway rules and regulations, the purchasing of Railway materials and the standardization of Railway technique, the Ministry of Railways organizes a number of committees and commissions.

In the Ministry of Railways, the Through Traffic Administration takes care of domestic and international through traffic and Railway clearing, the Bureau of Railway Statistics takes care of Railway statistics, the Railway Health Service takes care of the medical and sanitary affairs of the various Railways.

IV. Past Records of the Ministry of Railways

The Chinese Government Railways, having suffered repeated damages from internal strife, urgently need rehabilitation. The Ministry of Railways is confronted with two tasks; namely, the rehabilitation of the operating lines and the construction of new ones. As to the former, Minister Sun Fo's policies of Centralization of Administration and Independence of Railway Accounting System serve as criteria; as to the latter, great strides have been made towards the completion of the Canton-Hankow and the Lunghai Railways. The Ministry's work in the last year may be summarized as follows:—

A.—Actual Rehabilitation

1. Cancellation of military contribution, abolition of military surcharges and all miscellaneous charges on Railway fares.

2. Settlement and liquidation of domestic and foreign Railway loans and tabulation of Railway indebtedness through purchases.

3. Settlement of Military transport accounts.

4. Organization of the Advisory Committee on the Unification of Railway Accounts and Statistics, putting the accounting Rules and Classifications at work, and adjusting the accounts of the various Railways.

5. Putting the budget system in actual operation.

6. Clearing off the corruptions of the Nanking-Shanghai and Shanghai-Hangchow-Ningpo Railways.

7. Organization of the Railway Health Service, appointing health officers to the various Railways for improvement of sanitary conditions thereof.

8. Establishment of the Railway Police Training camp to train police for the protection of passengers.

9. Establishment of the Purchasing Commission to see that all purchases be made by means of open tender and to effect real economy in Railway purchases.

10. Inauguration of the Nanking-Hangchow through Express Train Service.

11. Inauguration of the Peiping-Pukow through express train service.

12. Investigation of the bridges in the various Railways and the piles of the Yellow River Bridge.

13.-- Inspection of the various Railways by Advisers and Technical Experts.

14. Investigation of the condition of the rail and sleepers of the various Railways.

15. Raising the wages of the laborers, changing the payment from a daily to a monthly basis and raising it from $7.50 to $14 or $20 per month.

16. Prohibition of child labor -- no child under fourteen years of age is to be employed by the Railways and youths from fourteen to eighteen are to be employed only for light manual work.

17. Building up a library and compiling charts and tables showing Railway working and Railway conditions.

B.—Extension and Preparation Work

1. Appointment of Directors of Construction to survey and construct the Canton-Hankow and the Lunghai Railways.

2. Surveying and investigation work in the Nanking-Canton, Canton-Hunan, and Canton-Yunnan Railways.

3. Drawing up and approval of the estimates for the construction of the Tatung-Puchow Line.

4. Appointment of specialists to maintain the road bed of the Nanking-Hunan Railway.

5. Convention of the Engineering Conference at Shanghai to discuss the plans for the projected lines.

6. Investigation of the physical geography and mining products in land 200 li around the projected lines.

7. Conducting hydrographic survey of the Yangtze River at the Wuchang-Hankow crossing for bridge building.

8.—Investigation of agricultural economy, starting from the Districts of Tai Chang and Wu Hsien in the Province of Kiangsu.

9. Getting the Nanking-Liaoning through express train service ready.

10. Unification of fares and rates by drawing up unified fares and rates tables to be effective on January 1, 1930.

11. Drafting of Railway service law.

12. Planning up-to-date dormitory and co-operative society for laborers, trial already being made in Shanghai and Changchow.

13. Establishment of the National Highway Planning Commission to draw up a program for national highway construction.

14. Investigation of the engineering, material and means of communication in the provinces and despatching investigators on economic conditions to the Province of Fukien.

V. Plans.

The future plans to be executed by the Ministry of Railways during the Period of Political Tutelage are briefly as follows :--

A.—Rules and Regulations

1. Unification of Rules and Regulations. A complete set of unified rules and regulations for all the Government Railways will be drawn up and promulgated.

2. Unification of Official Language. All the Government Railways shall hereafter use the Chinese as official language.

3. Regulation for appointment of Railway staff. Regulations governing the appointment, qualification, salaries and treatment of the Railway staff will be drawn up. The examination system will be gradually applied.

B.—Finance

1. Adjustment of Railway Indebtedness. A thorough examination of the indebtedness and the financial condition of the various Railways will be made. Plans for financial readjustment will be drawn up. The creditors of the Railways will be consulted in the actual execution of these plans.

2. Revision of Loan Agreements. A careful study of the existing loan agreements will be made. Principles in the contracting of loans will be worked out. Negotiation to revise the loan agreements which contain provisions that are contradictory to the principles or impose on the Railways unequal and inequitable obligations will be made. All loan agreements on Railways which are not yet constructed shall be nullified. Agreements of political loans made in the name of the Railways shall be revised.

3. Improvement of the Railway Accounting System. All Railways shall submit estimates and budgets to the Ministry for approval. A unified system of accounting shall be adopted. The Advisory Committee on the Unification of Railway Accounts and Statistics was reinstituted to carry out this policy.

C.—Traffic and Operation

1.—Revision and Unification of Fares and Rates. In view of the close relationship between the Railway fares and rates and the common welfare of the people, the Ministry of Railways organized the Advisory Committee on Fares, Rates and Classification of Goods for the purpose of unifying the fares and rates of the various Railways. But, although it is easy for the Ministry to classify the goods, determine their names and fix a rate for each, yet the cost of construction in each Railway, its history, the productions of different places, and their prices and market conditions vary. Hence, for the time being, only a uniform rate for passenger traffic (one cent per kilometre) can be fixed. The next step towards uniformity will be a uniform rate for goods in the various districts and the final one will be a uniform rates for the whole country.

2. Revision of the Train Time Tables. Hitherto, time tables were drawn up by the individual Railways themselves. Consequently, connections were not well made and through traffic was not well arranged. The Ministry plans to make the time tables in such a way that connections between the various Railways will be well made and through traffic will be best arranged.

3. Improvement of Working Conditions for Railway Employees. A thorough investigation of the living condition of the Railway employees will be made. Index numbers of wages and living standard will be worked out. A minimum wage will be fixed so as to raise the standard of living of the employees. At the same time, general education and technical training will be given to them. Also, co-operative societies will be organized, model village built, compulsory savings made and employment insurance policies purchased for the employees.

4. Through Traffic Arrangements. An annual conference for through traffic for the purpose of improving and extending through traffic arrangements in the country will be resumed. For international through traffic, the Fifteenth China-Japan Through Traffic Conference will be called, the Euro-Asiatic and the China-Japan-American through traffic arrangements will be made. Other through traffic services as those with marine and highway transportation will also be taken up.

5. Centralization of Railway Purchase. At the organization of the Purchasing Commission, all Railway purchase of locomotives, cars, steel rails, sleepers, bridges, machinery, steam or motor boat, and electric poles shall be handled by the Commission. All purchase of fuel, metal, electric material, cement, timber, oil and paint, asbestos, uniform, stationery, and printed matter amounting to $5,000 or above shall also be handled by the commission. Purchases of between $2,000 and $5,000 shall be made by the Commission upon the approval of the Ministry. Purchases of $2,000 or less may by made by the Railway Administrations. The Commission is making a study of the annual consumption of materials by each Railway. Long term contract in purchase will be signed by the Commission. Plans to establish metal shops and creosoting plants are already in progress.

D. Engineering

1. Repairs of Damaged Lines and Machines. The Government Railways and their equipment have suffered great damage

in the recent internal strife. Many Repairing Plants are now working full time. It is expected that the necessary repairs are made in the shortest possible time.

2. Improvement and Increase of Equipment in the Peiping-Suiyuan, the Peiping-Hankow, the Tientsin-Pukow, the Peiping-Liaoning and the Lunghai Railways. As the above mentioned Railways are the principal trunk lines of the country, traffic increases steadily. Equipments like the improvement of bridges and rails, the increase of locomotives and cars, the change of the new sleepers and the improvement of the telephone and telegraph systems etc. must be effected to meet the rising demands.

3. The completion of the Canton-Hankow, the Shanghai-Hangchow-Ningpo and the Lunghai Railways. A resolution of the Second Plenary Session of the Kuomintang Central Executive Committee decided to have the Canton-Hankow Line completed in 1932 and the Lunghai Line completed in 1934. Construction Bureaus for the execution of this resolution were established. It is expected that the completion will take place at the scheduled time. Plans for the completion of the Hangchow-Peikuan Section of the Shanghai-Hangchow-Ningpo Railway are also in full progress.

4. Establishment of Locomotive Works and other Factories. Although the Repair Shops of the various Railways can, under ordinary circumstances, take care of all the repairs, but the lack of funds has left a great deal of maintenance and repair work undone. Some of the shop were even closed down. The first step in solving this problem is then to put all these shops back to full time work. The second step is to improve and expand these shops. But in as much as this is a question of economy, the questions how much they should be improved and to what extent they should be expanded can not be settled as yet. A study of the conditions and possibilities is now being made. It is expected that a bridge building plant will soon be built in Wuhan for the manufacturing of standard bridges to supplant the old bridges of the operating lines and supply bridges for new lines.

5. Location and Construction of the Railway Net. As a first step towards the construction of the national Railway Net, the Ministry of Railways drew up a plan to use the Boxer Indemnity Funds and the Custom Surplus in the construction of Railways. The plan was adopted by the Central Political Council with minor changes. The Second Plenary Session of the Kuomintang Central Executive Committee adopted a resolution to complete the Canton-Hankow and the Lunghai Railways and to construct the Sinkiang-Kansu-Suiyuan Railway. Survey in the Nanking-Canton, the Canton-Yunnan, the Hunan-Yunnan, the Foochow-Nanchang, the Shaochow-Nanchang, the Paoking-Chinchow and the Chungking-Liuchow Lines will be finished in the near future. This plan (except the unfinished sections of the Canton-Hankow and the Lunghai Railways) including the Sinkiang-Kansu-Suiyuan Lines embodies the construction of 10,000 miles of Railways which would cost $1,214,000,000. It takes some time to raise such a great sum of money. The Ministry can at the present begin work on the Sinkiang-Kansu-Suiyuan and the Tsang-chow-Shihkia-chuan Lines. The Construction of other lines will begin in accordance with its order in the plan of the Minister.

6. Construction of National Highways. The Plan for national highway construction includes two kinds of highways; namely, the Ministry lines and the national defense lines on the borders. The total length is 67,000 li. The total cost would amount to $364,000,000. The whole program will be carried out in four periods. The financing will be taken care of by the appropriation of tax revenues and the issuance of bonds and notes. A complete and comprehensive plan for financing has been worked out and sent to the Legislative Yuan for approval. At present no time is lost in raising money for the first period's work which will require about $80,000,000 for 16,000 li of highway. When this is completed, work in the later periods will be taken up.

VI. Publications of the Ministry

A.—Periodicals.
1. The Railway Gazette (tri-daily)
2. The Ministerial Report (monthly)
3. Statistics of Railways (annual)

B.—Special Publications.
1. A Resolution to Use the Boxer Indemnity and Custom Surplus for the Construction of Railways (Proposed by Minister Sun Fo before the Kuomintang Central Political Council)
3. Table Showing the Annual Distribution of Work During the Period of Political Tutelage.
4. Economic Condition along the Nanking-Canton Railway.
5. A Plan to Use the Boxer Indemnity and the Custom Surplus for the Construction of Railways.
6. A Plan to Construct a National Highway System by Periods.
7. A National Highway Net-Work.
   Standard and Regulations for National Highways.
   Principles of Operation in National Highways. (The above three publications are bound into one single volume)
8. General Regulations for the Operation of Passenger Cars.
9. General Regulations for the Operation of Freight Cars.
10. Operating Statistics.
11. Mr. Mantell's Reports. (There will be altogether nine reports, one being a general report and one on each of the following Lines, (*a*) The Nanking-Shanghai and Shanghai-Hangchow-Ningpo Railways, (*b*) The Peiping-Hankow Railway, (*c*) The Peiping-Suiyuan Railway, (*d*) The Kiao-Tsi Railway, (*e*) The Canton-Hankow Railway, (*f*) The Canton-Kowloon Railway, (*g*) The Tientsin-Pukow Railway and (*h*) The Peiping-Liaoning Railway.)
12. Mr. Poland's Reports on Railway Finance.

Note: Publications of the various Railway Administrations are not included.

Mitsubishi Takes Over Westinghouse in Japan

The rapid development of Japanese electrical manufacturing enterprises turning out plant and equipment meeting every requirement of the national demand, except in the very largest units, is gradually closing the market in that country for foreign materials. The Mitsubishi Electrical Company, The Shibaura Engineering Works and the Hidatchi Engineering Works, together with several lesser manufacturers, have developed their plants and outputs to the point where under a little more favorable export conditions, they will be able to compete successfully in Asiatic markets with foreign manufacturers. A sign of the times is the announcement that the Westinghouse Electric Company of Japan ceased to accept new business and began liquidation on January 1. From then its business was taken over the Ryobei Denki Shokai, a newly-created subsidiary of the Mitsubishi Denki Kabushiki Kaisha, with which the Westinghouse Company of Japan has long been affiliated.

"Japan is rapidly becoming self-sufficient in the manufacture of electrical machinery," declared Mr. J. W. White, managing director of the Westinghouse Company of Japan, in explaining the reason for the new arrangement. "The only need for further importations of foreign electrical machinery is in the field of specialties, large machines and new inventions, for which the demand in Japan is so small that they cannot be produced by mass production and hence cannot compete with the imported articles.

"The Westinghouse Company of Japan has long realized the country's approach to self-sufficiency in this respect and has worked toward that end. Our association with the Mitsubishi Denki Kabushiki Kaisha has been mutually highly satisfactory and the new arrangement will be merely an extension of that association.

"There will be no difference to our past customers. The new company will occupy our present offices and about 75 per cent. of our staff will go over to it. The only part which will not be taken over is the clerical organization, whose work will be done by the clerical organization of the Mitsubishi interests."

The Ryobei Denki Shokai with have exclusive rights of importing Westinghouse products into Japan and will carry large stocks of these products, taking over the Westinghouse warehouse in Yokohama and its retail store on the Ginza. The articles handled will be chiefly Westinghouse importations with the addition of allied lines of which the Westinghouse Company of Japan has been the agent here in the past.

The new company will have a paid-up capitalization of Y.1,000,000 and will be under the complete control of the Mitsubishi Denki Kabushiki Kaisha, of which the present officers of the Westinghouse Company of Japan are shareholders and of which Mr. White is a director.

Although the Westinghouse Company of Japan ceased taking new business on January 1, it will continue to function until liquidation has been completed and its present contracts fulfilled. This is expected to take the larger part of a year. Its present staff will continue to handle this work and will gradually change over to the new company as it is completed. The foreign members of the present Westinghouse staff will continue as advisers to the new company. The same arrangement applies to the company's offices in Osaka and Dairen.

A comparison of the foregoing two tabulations will reveal the fact that the city investments are accountable for the largest percentage of those for the Provinces. To analyze and explain the investment conditions of cities, therefore, would be to a great extent tantamount to doing the same thing for the Provinces. To avoid repetition we shall briefly dwell upon the investment situation at the principal centers.

1. *Shanghai.*—The outstanding investment activity here is cotton spinning which, at Y.170,000,000, accounts for 60 per cent. of the entire capital tied up. (Note: refer to business investments classified by groups). In the order of importance carrier trade, banking and the East Asia Industrial Company investments follow the spinning industry. Then come many lesser corporate and individual enterprises. Relative importance of the real estate holdings of these interests closely follow this order, cotton spinning retaining an overwhelming lead. Settlement corporation disbursements are the annual expenses for running schools, hospitals, cemeteries and other social and cultural facilities.

2. *Peking.*—Leading investments in Peking are the Yokohama Specie Bank, the East Ascia Industrial Company, the Industrial Bank of Japan, the Mitsui Bussan Kaisha, the Mitsubishi Trading Company, the Furukawa Electro Industry Company, the Kuhara Mining Company, the Japan-China Dojin Hospital and others involving Y.6,000,000 capital outlay. This figure corresponds to 83 to 84 per cent. of the entire Peking investments and the remaining Y.1,000,000 represents the investments by indivduals and smaller business firms.

3. *Tientsin.*—Like in Shanghai, cotton spinning again dominates the Japanese business community, being responsible for 55 per cent. of the whole investment. Tobacco and safety match manufacturing, at 34 per cent, come second, followed by slaughter house, refrigeration, bone dust, leather tanning and other enterprises which are characteristic of the locality.

4. *Tsingtao.*—This city holds the second largest share of Japanese capital, surpassed only by Shanghai, cotton spinning and weaving and silk spinning mills being the most heavily capitalized, at Y.50,000,000. Enterprises with capital stock of from one to many millions of yen are numerous for safety match making, oil extracting, flour milling, meat dressing, warehousing and colliery activities.

5. *Hankow.*—As the second most important commercial port on the Yangtze, next to Shanghai, Hankow claims a large proportion of Japanese capital investments in China in foreign trade and water navigation concerns. The real estate holdings of these two activities assume the dimensions of Y.24,000,000, being 60 per cent. of the entire investment. Cotton spinning comes second at Y.6,000,000 or 15 per cent. and the remaining 25 per cent. is shared by banks, real estate and building companies, and retail establishments.

6. *Canton.*—The bulk of capital outlay in this community is for import and export trading and other commercial operations.

7.—*Dairen.*—The major part of Dairen investments are for the South Manchuria Railway Company and its subsidiaries, being accountable for Y.580,000,000. This figure about represents the approximate total of S.M.R. investments in Dairen where any separate assessments of its individual enterprises are difficult to make. Investments by other interests approximate Y.120,000,000 of which important shares go to the Dairen Steamship Company, Dairen Oil Manufacturing Company, South Manchuria Gas Company, Dairen Exchange and Trust Company, Manchuria Business Promotion Company and others.

8. *Mukden.*—Investments here run up to Y.50,000,000 of which Y.20,000,000 is contributed by tobacco, sugar refining, hemp spinning, ceramic, paper making, lumber working, tussah silk reeling, spinning and other industries. Finance and trusts are responsible for Y.12,000,000 investment, as is agriculture for Y.7,000,000, mining Y.2,000,000 and other Y.8,000,000, to cite further cases.

2 Japanese Loans to China

A complete lack of authentic data on Japan's investments in the form of loans to China makes any intelligent study of the subject next to impossible. An inquiry into the loan situation based on information, which seems to be fairly authoritative, discloses, however, that such financings outstanding at the end of 1928 assumed the proportions of Y.730,477,000 in the aggregate.

The above estimate, however, does not include claims amounting to about Y.109,918,000 of which 6 per cent. Treasury Notes of Tsingtao-Tsinanfu Railway, Treasury Notes for Compensation of Tsingtao Public Property and Salt Industry and Boxer Indemnity constitute a part. At the same time, it is within the bounds of possibility that quite a number of claim items have failed to come to our notice because of incomplete data at present available and these we may have an opportunity to correct at some future time. The following is a list of the more important of the loans which Japan has granted to China:

Denominations of loans and claims	Dat of loan	Amount (,000 omitted)
Japanese share of Chinese Government 5% Reorganization Loan for £25,000,000	1913	Y.49,880
Bank of Communications Loan	1917	29,794
Gold Mine and Forests Loan of Kirin Heilungkiang and Interest Loan	1918-22	58,234
Kirin-Heuning Railway Construction Advance	1918	12,625
Tsi-Shun Kao-Hsu Railway Construction Advance	1918	25,600
Four Railways in Manchuria and Mongolia Construction Advance and Interest Loans	1918-25	50,362
War Participation Loan and Interest Loan thereon	1918	38,895
Arms Loan and Interest Loan	1917	62,443
Telegraph Loan and Interest Loans	1918-25	38,724
Advance for Ssu-Tao Railway	1918	32,000
Chinese Government Ssu-Cheng Railway	1916	4,780
Chinese Government 5% Railway Loan of 1911	1911	12,738
Peking-Suiyang Railway Loan	1917-25	17,871
Telegraph Extension and Improvement Advance and Interest Loan	1910-16	13,398
Telephone Extension Loan and Interest Loans	1919-23	22,559
8% Bonds for Refunding Internal and Foreign Short Term Debts (Japanese portion)	1922	37,675
Engraving Loan, Ministry of Finance	1918	4,216
Shensi Copper Mine Loan	1910	5,410
Other Loans and Claims		213,273
Total		730,477

Of the above Y.730,477,000 loans, Y.64,000,000 are funded and the balance Y.666,477,000 are unfunded.

Chinese Government obligations account for Y.553,237,000 and corporate and individual debts Y.177,240,000.

While it is impossible to draw a clear line of demarcation between loans on which interest payment is being effected without a hitch and those on which such disbursements are in arrears, Y.54,660,000 indebtedness probably belongs to the former class and the remaining Y.675,817,000 to the latter description.

Classified by the purpose of the loans:

1.	General financial	Y.142,354,000
2.	Railway	164,219,000
3.	Communications	75,609,000
4.	Military	102,559,000
5.	Industrial	245,090,000
6.	Miscellaneous	646,000
	Total	Y.730,477,000

Another method of classifying Chinese loans, which is occasionally used, is by whether their security pledged is sound or not sound, but we have refrained from making such a classification here as we consider it largely a matter of opinion and serves no practical purpose after all.

Manchuria's Thousand Mile Railway Program

THAT the Chinese are determined to circumvent Japan's economic expansion in Manchuria by developing their own railway lines, building their own harbors, establishing their own industries and commercial enterprises, is indicated by the announcement from Mukden that five new railways with a total mileage of about 1,000 miles are to be built during the present year. The Chinese in Manchuria are not making boasts about driving the Japanese out by force of arms, or are they raising diplomatic issues as to the validity of the 1915 or any other treaty. There is no talk of fighting to the last man to save the province from Japan, nor is there any propaganda campaign to have Americans intervene by force to defend their territorial integrity

or sovereign rights. The Chinese officials throughout Manchuria accept the permanence of Japan's position in South Manchuria, and realize that what she holds, she will keep. So they have deliberately planned to construct a network of Chinese railway lines connecting up all the principal cities in the Three Eastern Provinces in order to liberate them from dependence upon the Japanese controlled system.

Although some of the new railways infringe on the treaties with Japan stipulating that no new lines may be built paralleling the South Manchuria line, the Japanese have not protested vigorously against this breach of faith. The Japanese feel that all these new and projected Chinese railways will swell the traffic of their own lines and increase their profits. The Japanese, in effect, state that the more new railways, the better it will be for Manchuria, and the more chance they will have of benefitting from the development of the vast resources of the province. Japan's policy toward these new developments is identical with her attitude towards the rest of China; every mile of new railway in any part of China that opens up new territory and markets, will benefit her trade, and she don't particularly care who builds or finances them.

The Manchurian officials with the vast resources of the three provinces to draw upon for taxes, have always sufficient funds to carry through their constructive plans. They are not handicapped by defaulted loan payments or by military interference in the operation of the lines within their jurisdiction. The competition between China and Japan to develop this territory in engendering a spirit of co-operation that although somewhat different to what Japan originally hoped to bring about is rapidly tending to solve a problem that for many years, has embittered relations between the two countries. In this, the Manchurian Chinese are showing common sense, a better appreciation of what they are up against than is apparent in Nanking. With prosperity, peace, stability, protection and an assurance of justice in Manchuria for ten years, the Manchurian problem will automatically solve itself.

Much of the friction between the Japanese and Chinese in Manchuria, arose out of Chang Tso-lin's ambitious plans to conquer the rest of China, draining the province of its wealth to defray the cost of these wars. Had Chang Tso-lin kept within his own bailiwick and employed the money wrung from the farmers on public improvements and development works, Manchuria would have witnessed a boom that would have astonished the world. Now that his son is minding his own affairs and devoting his energies to constructive measures, Manchuria will once more forge ahead of the rest of China as the most profitable and active market for engineering materials.

The new lines to be constructed this year by the Manchurian authorities are:

1. Kiutai-Changkiawan Railway:—This line will start at the Kiutai Station of the Kirin-Changchun Railway and terminate at the Changkiawan Station on the Chinese Eastern Railway with a total mileage of over 27 miles. The proposal to construct this railway was submitted by the Kirin Provincial Government. It will facilitate transportation between the Provincial capital of Kirin and Harbin. Work will be started shortly and all construction expenses will be borne by the Kirin Provincial Government.

2. Hsinkingfu-Fushun Railway:—The plan to construct this line was submitted by the Hsinking Chamber of Commerce which was subsequently approved by the Northeastern Communications Committee. The line will be a semi-official enterprise and part of the construction expense will be furnished by the Shenyang-Hailun Railway Administration and part to be subscribed by the commercial interests of the two terminal cities. The length of the line will be 40 miles (120 li) and construction is expected to begin in the middle of May following completion of surveying.

3. Tsitsihar-Heiho Railway:—The lack of communication facilities along the Heilungkiang border was keenly felt during the recent Sino-Soviet dispute when Heibo was threatened by Soviet troops. The Northeastern Communications Committee, therefore, will petition the Central Government to reserve part of the returned Boxer Indemnity for the construction of this 600 mile line. A special representative of the North-Eastern authorities will soon leave for Nanking to confer with the Ministry of Railways relative to the proposed construction.

4. Kaiping-Fuchow Railway:—The construction of this line was first proposed in 1927 but the project was dropped on account of Japanese participation which was regarded as an infringement of China's sovereign rights. The present scheme is to make the line a semi-official enterprise as the salt merchants in the district will subscribe for all the private shares. A petition for construction of this line will be submitted to the Communications Committee for consideration immediately after completion of the survey.

5. Hulan-Holihkang Railway:—This line will start from Hulan and terminate at Holihkang in Heilungkiang. The plan is initiated by the Provincial Department of Reconstruction of Heilungkiang to facilitate the transportation of coal from the Holihkang mines. Construction expenses will be borne by the merchants of Hulan and Payenchow and also the Holihang mining interests.

Economics of Flood Control in China

By MAJOR O. J. TODD

[This article is one of a series prepared under the direction of Dr. J. A. L. Waddell, Advisor to the Ministry of Railways of China. Other articles in this series have been published in previous issues of the "Far Eastern Review."]

CHINA's flood problems have always been formidable, and her people have felt their incapacity to deal adequately with them in extreme conditions. This old country has learned many things from her floods through the centuries of her recorded history; and among these is this—it is a work requiring broad co-operation and huge expenditures of human effort and materials.

Between floods China rests complacently, and does only moderate up-keep on dykes, river walls, groins, etc. Then extreme high water of summer causes anxiety where dykes are known to be weak. The factor of safety on river protection is low, as a rule; and dyke-breaks are not infrequent occurrences. For example, the one just now occuring on the south bank of the Yellow River, near the border of Shantung and Hopei (Chihli) Provinces might have been prevented by the expenditure of the $20,000 which was appropriated more than a year before the break occurred for the purpose of strengthening the point of rupture. This fund was used for other purposes; high water came in mid-August of this year; the dyke failed; and four counties suffered heavily from flood losses. The cost of repairs may run to $500,000. Thus China suffers from floods on the Yellow River.

The Yangtze River has gone out of its banks in high water periods so frequently that in many districts no determined efforts have been made to safeguard the river-bottom lands. The Han River, too, in Hupeh, has caused millions of dollars of losses by dyke-breaks that have drowned out valuable crops of beans, rice, cotton, kaoliang, etc. Heavy flood losses occurred in Kiangsi Province along the Han River in 1924 and again two years later. A little less damaging floods occur occasionally in Hunan Province along the Siang River. Again, in the Canton delta, the West River has caused damages that have run into many millions, because that river has not yet been properly controlled.

In cataloging the chief rivers of China that go on rampages and cause many millions of dollars in losses, besides the toll in human lives, there must be included the Hwai River, coming through Anhwei and Kiangsu into the Yellow Sea. The flood of 1922 on that river has been estimated as causing $300,000,000 damages to crops and to village and town property.

The river system of Hopei (Chihli) emptying into the sea near Tientsin, offers problems to the conservancy engineer. Here a flood of unusual extent so damaged property in Tientsin in 1917 that a special Commission was formed the next year to study this particular problem. While these studies were still going on, the floods of July and August, 1924, occurred, causing $200,000,000 in damages to farm crops alone and the submerging of 10,000 square miles of farm lands. Minor floods and dike-breaks on the Yung

Engineering Notes

ELECTRIC LIGHT, POWER AND TRACTION

THE AGATSUMAGAWA ELECTRIC POWER CO.—The Otsu power station, 2,000 k.W. of the Agatsumagawa Denryoku K.K. will be completed by April. The company is preparing to proceed with the second part of its plan, and will build Nishikubo Power station 18,000 k.W. and Imomata Power station, 7,000 k.W. on the Agatsuma River. Work has already started on the foundations of these stations, which on completion will increase the output from 23,000 k.W. to 50,000 k.W.

CHINA LIGHT & POWER CO.—Mr. R. G. Shewan, who presided over the annual general meeting of the China Light & Power Co., Ltd., shareholders, was able to give a very satisfactory review of the last year's working. Gross profit had increased to nearly $545,000 as against $531,000 the previous year, and a final dividend of 9 per cent., making 14 per cent. for the year, had been recommended.

Units sold showed an increase of 29 per cent., and so great was the Company's development that the Directors had sought the services of Mr. A. H. Preece, a well-known London expert, who had reported most satisfactorily on the Company's position and policy.

KYUSHU SODEN K.K. The Kyushu Electric Transmission Co., Ltd.). —The Kyushu Soden K.K. has completed the 39 kilometers transmission line from Tashiro Power Station with 8,000 k.W. and at present under construction on the Mimi River in Miyagi Prefecture to Takachiho Substation of the Kyushu Suiryoku Denki K.K. (Kyushu Hydro-electric Co., Ltd.). This transmission line was constructed under the contract to supply the power from Tashiro Power Station to the Kyushu Suiryoku Denki K.K., so that the latter can supply this power to the Kurume district. After the completion of the Tashiro Power station, the Kyushu Soden K.K. is further planning to build larger power stations, one at Yamasuhara with a capacity of 13,000 k.W. and the other at Tsukahara with 50,000 k.W., the latter of which will be situated on the upper stream on which the Tashire Station is being built.

ELECTRIFICATION IN THE PHILIPPINE.—The Furukawa Plantation Co., one of the leading industrial concerns of the Davao district, has recently purchased a new plant from the Pacific Commercial Co., to complete electrification of their outfit.

A 260-horse power Fairbanks-Morse Diesel engine will drive a 220-kVA., 2,300-volt, 3-phase General Electric generator. Power is to be transmitted to two plants, where the voltage is to be stepped down by means of 3-phase G. E. transformers to 440 volts, and used to run a number of motors. All of the equipment used in the working of hemp will be motor-driven. The secondaries of the transformers are so arranged that 220 volts can also be obtained for lighting purposes.

The installation is expected to be completed early in 1930, and will be one of the most up-to-date industrial plants in the Philippine Islands. Even the small water circulating pumps in the power plant will be driven by electric motors, and all of the houses on the plantation will have the benefit of electric light and power.

It is also of interest to note that a 75-horse power synchronous motor of 80 per cent. leading power factor is to be installed in the main plant to correct the power factor of the system. This is a convenient and very practical system of correcting any possible future trouble of overloaded lines, due to low power factor, and will be of interest to all industrial men contemplating electrification of their plants.

TOHO DENRYOKU K.K. (The Toho Electric Power Co., Ltd.).—The Toho Denryoku K.K. has decided to increase the capacity of Najima Steam Power station from the present 40,000 k.W. to 90,000 k.W. considering an increase in demand in future. The company will start the extension from the next year. It is reported that Shinonoseki steam power station capacity is also increased to 20,000 k.W. from 10,000 k.W.

TRANSMISSION LINES IN MANCHURIA. —In order to meet the rapidly increasing wants for electric light and power, the Port Arthur Civil Administration has arranged to obtain a supplementary supply of power from the Amanogawa Power Station of the South Manchuria Electricity Co., Shakako, Dairen.

At the outlay of Y.330,000, specially high pressure transmitting lines of 11,000 volts have been laid between the Amanogawa Power Station and Port Arthur over the distance of 36 kilometres, besides a transforming station, just completed at Port Arthur.

As soon as the new installation is proved satisfactory to the General Post Office experts, the supply from Amanogawa will be commenced.

INDUSTRIAL

JAPAN'S SOUTH SEA PROJECT.—The Oriental Development Company is now studying a most practical means of investing in rubber, cocoanut and the like cultivation enterprises in the South Seas with a capital of 50,000,000 yen. The authorities as soon as the draft plan is complete will consult the Government as well as the Overseas Affairs Ministry with the project that it may be launched in the course of next fiscal year. The Development Company, when the plan is mature, will first advance the sum of Y.20,000,000 to the willing Japanese enterprisers in the South Sea islands.

OIL PROSPECTING IN BRUNEI: The British Malayan Petroleum Co., Ltd., is continuing prospecting in Brunei, and hopes are now entertained that their operations may be successful. Oil was first found in the territory at Labi, close to the boundary of Sarawak, in 1914, and the original well continues to supply sufficient oil for the requirements of drilling operations. Elsewhere good shows of gas have been obtained, but no further occurrences of oil have been met with. However, the company began more active operations with a Rotary drill at the end last year, and oil prospecting licences are being operated for a considerable distance along the Coast eastwards from the Belait river, and are considered to show possibilities of oil being obtained in large quantities.

ASSOCIATED OIL AND MITSUBISHI PLANT.—A definite understanding has been reached between Associated Oil of America and the Mitsubishi Goshi Kaisha for starting in Japan a joint oil refining and distributing enterprise. A capital stock of Y.5,000,000 will be subscribed half and half and working funds will be amplified by additional Y.2,000,000 of unfunded debt. The Associated Oil will contribute manufacturing skill and machinery as well as it will guarantee an uninterrupted supply of crude oil. Mitsubishi men will be named for president and managing-director and a vice-president will be an Associated Oil man.

A refining plant will be located in Tsurumi equipped to produce 7,500,000 gallons of gasoline a year. The manufacturing facilities will be complete by March next year and the first shipment will be out toward some time next autumn.

AN OIL FIELD IN SZECHUAN.—The *Shun Pao* contains a report from Szechuan as to the discovery of a kerosene area, in the P'eng Ch'i district, which gives good promise of proving a valuable source of supply of this useful commodity. The district referred to abounds in salt wells, which are holes bored deep into the earth, from which brine is drawn for the manufacture of salt. It appears that over thirty years ago a source of oil was unexpectedly tapped, the impression at first being that the product was some unusual kind of water, until a light was accidentally applied, when the liquid burned. It was then used to supply the heat for evaporating the brine, but only in very small quantity. In 1896, a Mr. Li, of Chungking, proposed the use of modern appliances to develop the oil industry. About that time many local disturbances took place, interfering with the work, and then came the Boxer uprising in the course of which the well was destroyed and all work stopped.

Interest has now been revived, and a Swiss expert who has examined the locality, is said to have reported that it may prove to be the world's fourth largest oil field. Permission is now being sought to proceed with the development of the industry, and it is hoped that this may be so successful as to supply China's needs, and so avoid having to import foreign petroleum.

RAILWAYS

TOKYO CHIKA TETSUDO K.K. (Tokyo Under-Ground Railway Co., Ltd.).—The construction of under-ground railway between Ueno and Manseibashi of the Tokyo Chika Tetsudo K.K. has been completed and will be opened by the end of January. The company is now planning to extend the line from Manseibashi to Kanda, and in order to demand for new capitalization. According to the current report the directors have decided to double its capital to the extent of Y.40,000,000.

MADRAS ELECTRIFICATION.—The English Electric Company, Ltd., which has a Branch Office in Ipoh, has received an important contract from The South Indian Railway Company for the rolling stock required for the electrification of the Madras Suburban Services. The order comprises 17 three coach articulated units, each unit consisting of three all-steel coaches, together with the necessary electrical equipment. In addition, there are four electric goods locomotives. The total value of the contract amounts to £170,000.

"SENTINEL" CARS FOR CHOSEN RAILWAYS.—Mr. Iwasaki, Chief of the Mechanical Section of the Chosen Railway Bureau, says that one of the two Sentinel cars under construction at the Ryuzan shops, will be put on the Seoul-Jinsen Line on December 1. The steam pressure of its engine was 21.1 kilogrammes per square centimetre as compared with the 14 kilogrammes of locomotives of larger type and was capable of developing a speed of 55 miles an hour with sixty-four passengers on board.

DIESEL LOCOS FOR S.M.R.—The S.M.R. has ordered two Diesel electric locomotives, one from Sulzer and the other from M.A.N. of 700 h.p. and 750 h.p. respectively at a cost of about Y.400,000. Mr. Kobayashi of the Engineering Office and Mr. Takahashi of the Shakako Railway Workshops, have been sent by the S.M.R. to Europe.

The two locomotives it is expected will be completed and tested in Europe about August, 1930, being due at Dairen about the middle of October, where they be used in the Dairen yards and for shunting purposes.

CHOSEN RAILWAY EXTENSION.—It is reported that the Chosen Railway Company has recently made arrangements to extend its line from Kaishu to Tojo on the Kokai line, 47 miles in length, at an estimated cost of about Y.375,000. Work will be started early in Spring.

NEW SIBERIAN RAILWAYS.—Work on the five-year program for the development of the transport system of the Soviet Far East will commence from December 1.

It is expected that as a result of these plans the railway net revenue of the Ussuri and Zabaikal railways will be much increased. Several railways will be built in Saghalien and one will be constructed from Habarovsk to Sovetsakaya Gavan.

In Vladivostok, Amur and Habarovsk regions, there will be built many railway branches to the sea in order to increase the number of the fishery stations on the coast and to facilitate the connection of these stations with the main trunk-railways of the Soviet Far East.

NEW CHINESE LINES IN MANCHURIA.—The new Chinese railway schemes shelved by the Soviet-Chinese difficulty, are said to have been revived by the authorities.

As to the Tsitsihar-Koshan line; for which a public loan is being floated, the rails have been laid up to Koshan, and the line will be opened to traffic by January next.

As regards the Ssufangtai-Wangkuei branch line to the Hulan-Hailun line, the Hulan-Hailun line people are carrying on the surveys on a concrete plan mapped out there-by, and work will be started on the return of spring.

The Kirin-Tungkiang line *via* Wuchang, Imienpo, Sansing, and Fuchin, over 2,000 Chinese "li" in length, work will be commenced in the autumn next year.

The plans for other lines such as one between Payen and Holikang along the Sungari in Heilungkiang Province, the Anda-Paichuan line, and the Taonan-Solun line are also being pushed forward.

PUBLIC WORKS

NEW KANCHINGTZU COAL PIER.—The construction of the new Coal Pier at Kanchingtzu (across the Bay), has been finished within 10 per cent. of completion. It will be opened to service from May next, as planned. The new 3-storeyed building in reinforced concrete for joint use by the Kanchingtzu Coal Pier Office, the International Express Co., various shipping firms, the Marine Office, the Marine Police, and the signalling station is also nearing completion.

JAPAN'S LONGEST TUNNEL READY.—The construction of Shimidzu Tunnel which is being constructed between the high passes of Gunma Prefecture and Niigata Prefecture to connect practically Outer Japan and Inner Japan was completed on December 29.

Shimidzu Tunnel is claimed to be the longest one in the East, ranking the sixth in the world. The whole length of the tunnel is 6.1 miles and the tunnel is situated at the height of 6,000 feet above sea level. The total cost for the construction of the tunnel amounted to Y.5,200,000 at the rate of Y.320 per foot.

RECONSTRUCTION OF HULUTAO HARBOR.—The Mukden Government plans to start the reconstruction of Hulutao Harbor, sometimes called Lienshan Bay, southeast of Shanhaikwan on the Peiping-Mukden Line, as soon as the weather permits.

Necessary funds are to be defrayed out of the earnings of the Peiping-Mukden Line.

About the same time, the port facilities of Newchwang will also be improved with a view to making it an outlet produce stocks carried south *via* the Paiyintala-Tahushan Line.

F.M.S. RIVER IMPROVEMENT SCHEME.—The F. M. S. Government's scheme for flood mitigation at Ipoh is almost ready to be put into operation. A flotilla of three dredges has been constructed. The largest dipper dredge, capable of treating one cubic yard a minute, is at work dredging to a depth of from six to 10 feet. The dredge draught is 2-ft. 8-ins.

As soon as the hydraulic department has taken over from the erectors the dredges will work down at Sungei Pari till the Kinta River is reached and will then work on the Kinta River in the direction of Ipoh.

The dredges will be continually employed in the maintenance, and improvement of rivers draining Ipoh.

OSAKA SUBWAY CONSTRUCTION.—Osaka received on December 28, a license permitting the issue of a loan to the amount of Y.6,660,000 with which to start the construction of the much talked-about rapid transit system within and around the city.

It was announced that the awarding of a contract to builders will be taken immediately so that the actual work be started by the end of January at the latest. He announced that the line along the Mido-suji highway of the No. 1 route will be built to begin with.

The system, which consists of four lines of both elevated and underground railways, when completed, will unite the many interurban electric railways that radiate from Osaka in all directions, reaching Kyoto in the north, Nara and Wakayama in the south, and Kobe in the west.

When all four lines are combined, the total mileage of this system will extend 33.86 miles. The work will start with only about 0.9 mile at five different places mainly on Line No.1 however.

(Detail of this plan appear in an article in the December issue of the "Far Eastern Review.")

NEW BRIDGES FOR CANTON.—Canton is to have a suspension bridge from the Bund at the end of Wei Sun Maloo across the Pearl River to Honam Island. The contract for its construction was signed between the Canton Municipality and Messrs. Andersen, Meyer and Co. on October 12, at a cost of $1,035,000 of which bargain money of $50,000 has already been paid by the City.

The bridge is to be completed within 21 months from date of contract, the work to start within one month thereof. The company has already shipped to Canton from Tientsin and Shanghai over ten tons of equipment, machinery and materials, and it is stipulated that the company is to supply all the steel work and machinery, while Messrs. McDonell and Gorman, American engineers, attend to the engineering part of the work.

The design of the bridge follows American standards and the structure carries a guarantee of 30 years from the company.

The length of the bridge is to be about 600-ft. consisting of two approach spans, each being 220-ft. long, and Scherzer Rolling Lift spans comprised of leaves 160-ft. long.

The width of the bridge is to be 60-ft. with a roadway in the centre of 40-ft. while there will be a clear footpath on each side of 10-ft. wide of which a space of 5-ft. is for pedestrians and 5-ft. for rickshas.

The weight of structural steel for the bridge will be 1,700 tons, and cast iron and re-enforced steel 85 tons. Work has already started on the Bund and Honam side.

It is also reported that arrangements have been completed for the construction of three steel bridges spanning the Pearl River and connecting the city of Canton with Honan island. It is announced by the provincial reconstruction department that work will be started on December 1. The bridges are expected to be completed in the following winter. To meet the necessary expenses for carrying out various projects of the River Conservancy Board for Kwangtung, the Central Government has ordered that appropriations be remitted to the board from the national revenue collected in Kwangtung by the Department of Finance.

SHIPPING AND SHIPBUILDING

O.S.K.'s SYDNEY MARU CREATES RECORD.—The O.S.K.'s new Diesel freighter, *Sydney Maru*, 5,435 gross tons, which left Kobe for Australia on her maiden voyage at 9 a.m., December 7, arrived in Brisbane at 7 a.m., December 26, via Moji, Hongkong and Manila, the time for the voyage being 18 days and 21 hours, according to a telegram just received from Brisbane. This is 24 hours less than expected, reducing the former schedule time by six days. This is considered a remarkable record in the Australian service of the Company's cargo boats. The *Sydney Maru*'s highest speed registered at the time of the trial run was 16,136 knots per hour.

TATSUTA MARU'S TRIAL RUN.—The *Tatsuta Maru*, sister ship of the *Asama Maru*, of the N. Y. K. Line, was given her official trial run on December 27 and developed a speed of 21.232 knots per hour, easily averaging 20.930 knots per hour. The contract speed of the vessel is stated to be 19.5 knots. The big new liner is reported to have behaved splendidly and to the satisfaction of all concerned.

On the trial run the builders and high officials of the N. Y. K. were aboard and expressed themselves as highly-pleased over the vessel. The liner, as is the *Asama Maru*, is equipped with four Sulzer Diesel engines capable of developing 1,600 s. h. p. Her cabins and public rooms, it was announced, will be substantially the same as the crack *Asama Maru*, except that the decoration scheme will strike an entirely new note.

The *Tatsuta Maru* is due to sail on her maiden trip from Shanghai on April 18.

SIAMESE GUNBOAT.—The Siamese gunboat *Sukhodaya*, which has been specially designed for river estuary, and coastline patrol service, was launched from Messrs. Vickers Armstrongs' naval construction works at Barrow on November 19. Mme. Nunkae Bahiddha, wife of the First Secretary to the Siamese Legation in London, performed the launching ceremony. The British Admiralty were represented by Captain A. Maitland-Dougall, of H.M.S. *Resource*. Commander C. W. Craven, managing director of the Barrow and Newcastle works, represented the builders, and Sir Archibald C. Ross the builders of the engines, Messrs. R. and W. Hawthorn Leslie, of Newcastle.

The *Sukhodaya* is a steel twin-screw ship with a length of 173-ft., and is similar to one built on the Tyne by Messrs. Armstrong Whitworth. She has armor belt of nickel steel fitted for her full length, with armor bulk-heads and screens. The upper deck is plated with heavy steel to afford protection against aerial attack. She will carry two 6-in. guns and four 3-in. high-angle guns with the latest system of fire control. Ammunition will be carried to the guns by electrical power. The main propelling machinery consists of two sets of inverted triple-expansion engines capable of developing 850 horse power, steam being supplied by two water tube boilers.

ENGINES OF EMPRESS OF CANADA.—Striking improvements in steamship propulsion will be observed in the new Canadian Pacific liner *Empress of Japan*, which is to be launched in April.

The *Empress of Japan*, which will be the largest commercial ship of the Pacific, and which is expected to cut the run between Vancouver and Japan to nine days, will be propelled by two sets of three casing Parson's type turbines of the latest design. Instead of using super-heated steam at a pressure of 215 pounds per square inch, the new ship will be fitted with Yarrow water-tube boilers and integral super-heaters, the steam pressure being 375 pounds and the temperature 700 degrees F.

The power of the new installation will be 30,000 s.h.p., and it is anticipated that the consumption rate will be as low as .60 of a pound per s.h.p. per hour for all purposes.

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

Most Important American Pronouncement on Far Eastern Affairs

AMBASSADOR CASTLE'S SIGNIFICANT SPEECH IN TOKYO

MANTELL ON THE NANKING-SHANGHAI RAILWAY

BARON SHIDEHARA ON CHINA

THE AIR MAIL PROBLEM IN CHINA

Vol. XXVI | February, 1930 | No. 2

Mantell on the Nanking-Shanghai Railway

American Advisor's Sharp Criticism

DR. J. J. Mantell, a practical American Railroad man, retained by Mr. Sun Fo, Minister of Railways in China, has submitted to the Ministry of Railways, nine reports. Eight of them deal with the lines he investigated; the ninth is general on the entire system. Mr. Mantell was unable to inspect the Lunghai Railway because of the military situation in China. The first report released by the Ministry of Railways was that which covered investigations on the Nanking-Shanghai and Shanghai-Hangchow-Ningpo Railways.

The Nanking-Shanghai Railway was begun in 1904 and was opened in April 1908. The finances for the railway were secured by a loan from the British and Chinese Corporation which is a joint undertaking of the Hongkong and Shanghai Banking Corporation and Jardine, Matheson & Co., the great British merchandizing firm. There were three issues of mortgage bonds, totalling £3,050,000; the amount outstanding on December 31, 1927, being £2,900,000 and there was a default on June 1, 1927. The Chinese Government investment in the line amounts to Mex. $5,686,900.47. The security for the foreign loans are the railway, its property and equipment. The entire transaction is covered by a loan agreement and a working agreement which were not modified until January 1930, when the following correspondence was exchanged between the Ministry of Railways and the British and Chinese Corporation:

Shanghai, January 22.

H. E. the Minister of Railways, Nanking.

Sir,—As a result of negotiations in London between Your Ministry's Representative, Mr. Jun-ke Choy, and this Corporation, on the subject of Nanking-Shanghai Railway administrative questions and the Purchasing Agency, I am instructed by my principals to address to Your Excellency the enclosed two letters which I have been duly authorized to sign as representative of the British and Chinese Corporation, Ltd.

I have the honor, etc.,

The British and Chinese Corporation, Ltd.

ALEC L. DAVIDSON,

Representative.

"As Representative of the British and Chinese Corporation, Ltd., I have the honor to place on record, for facility of reference, the conditions of management of the above named railway which have recently been clarified by mutual understanding between your Ministry and the Corporation, acting as Trustees for the bondholders and the holders of net profit certificates.

"(1) In furtherance of the policy of direct operation of the Railway by the Ministry and for carrying out the responsibilities imposed upon the Board of Commissioners under Article 6 of the Loan Agreement, the Ministry of Railways shall appoint a Representative who shall be acceptable to the Corporation, to be Chairman of the Board of Commissioners and to exercise the functions of the Board.

"(2) The Ministry of Railways through its Representative shall administer the railway in accordance with the Loan Agreement and the Subsidiary Agreement of June 10, 1924, and shall control the appointment of all the officials and employees of the railway, except that in the case of the Engineer-in-Chief and the Chief Accountant, these officials shall be nominated by the Corporation for appointment by the Ministry. It shall be the duty of these officials to report to the Representative of the Corporation upon the affairs of the railway, and the Representative of the Ministry will consult with these officials upon technical and financial matters affecting the operation of the Railway.

"(3) The Board of Commissioners shall meet to receive, consider and pass the annual report and accounts of the railway, and this meeting shall take place as soon as possible after the conclusion of each financial year. Special meetings may be called at the request of two members, provided that the object of such meeting is notified to members of the Board one week in advance of the date of the meeting.

"The Board of Commissioners may at any time call upon the Representative of the Ministry to report to them in writing upon the affairs of the Railway.

"(4) The Engineer-in-Chief of the Nanking-Shanghai Railway is *ex officio* concurrently Engineer-in-Chief of the Shanghai-Hangchow-Ningpo Railway and, in the event of his absence on leave, or from other cause, his duties shall be temporarily performed by the Personal Assistant, who shall be entitled Deputy Engineer-in-Chief and shall be a British Engineer.

"The above conditions of management of the Nanking-Shanghai Railway which result from the principle of direct operation of the railway by your Ministry are accepted by the Corporation with a desire to assist in the aims of your Ministry for achieving the greatest possible efficiency in the management of the railway. I shall be obliged if your Excellency will confirm the understanding reached in these conditions."

(SECOND LETTER)

"As Representative of the British and Chinese Corporation, Limited, I have the honor to state that, in order to meet the wishes of the Ministry of Railways, and in consideration of the creation of the Central Purchasing Department of the Ministry, this Corporation is prepared to relinquish its rights, under Article 9 of the Loan Agreement, to receive (for its superintendence and services) the remuneration of 5 per cent. on the entire cost of materials purchased for the Railway.

"For their services as trustees for the bondholders and agents for the Railway, it is understood that the Ministry of Railways will pay to the Corporation the remuneration of £3,500 per annum during the terms of the Loan Agreement, and the Corporation agrees to superintend and serve in connection with the purchase of materials, whenever called upon to do so by the Ministry, without extra remuneration. The above remuneration will be paid to the Corporation half yearly from the revenues of the railway on the dates of payment of interest on the Loan, *viz*: on May 18 and November 17.

"I shall be obliged if Your Excellency will confirm the understanding reached on those terms."

The Ministry of Railways officially announces that the understanding reached on those terms between the representatives of the Ministry and the British and Chinese Corporation, Limited, has received the approval of Mr. Sun Fo, Minister of Railways.

The Shanghai, Hangchow and Ningpo Railway is an amalgamation of three lines: the main line is the Chekiang provincial railroad; there is a connecting line with the Nanking-Shanghai Railway and a branch line, branching out of Ningpo. This railway should, in fact, be a part of the Nanking-Shanghai Railway, the whole providing a unit line in Kiangsu and Chekiang, but because of loan arrangements, the lines have maintained a separate identity.

The Shanghai-Hangchow-Ningpo Railway was built by Chinese engineers, assisted by a British engineer. It is mortgaged to the British and Chinese Corporation for £1,500,000, the amount outstanding on December 31, 1927, being £862,500. The Chinese Government investment in the line is Mex. $17,657,509.75. The British and Chinese Corporation's mortgage is secured by the Railway property and revenues and surplus earnings of part of the Peking-Mukden Railway.

For many years, these two railways were regarded as the best managed lines in China, although there has for years been disagreements between the British general managers and the Chinese Managing directors. This disagreement reached its apex in 1929 in differences between Mr. Jun-Kee Choy, the Managing Director and Mr. A. C. Clear, the British Managing Director which resulted in Mr. Clear's resignation.*

Mr. Mantell's investigation must be regarded as impartial and scientific. It will be found that he has been critical, but he has been no less severe with other lines. Mr. Sun Fo has inherited a broken-down railway system which he is seeking to rehabilitate and it is of no advantage to him, to the Ministry of Railways, to China or to anyone else to suppress the facts. Nor can there be any refinancing or improvement until all the facts are made public.

In the covering letter to his report, Mr. Mantell makes the position of this railway perfectly clear in the following paragraphs:

> In conducting the survey of these railways it was very apparent that the railway affairs were being handled on a very improper business basis. Unnecessary waste of money was apparent and an exceedingly large number of employees was at work in the different departments to produce a given effort.
>
> The over-staffing of the railways and the lack of proper supervision and instruction would make it difficult to make recommendations for improvement before conducting a careful and detailed diagnosis.

Mr. Mantell cannot avoid discussing the inefficient utilization of labor, the duplication of work, and the lack of modernization of business methods. As regards the so-called cheapness of Chinese labor, Mr. Mantell's comments are particularly interesting:

> You will note in the report for different basis items of expense comparison is made with representative American Railroads in different sections of the country. American labor receives from eight to ten times as much wages as Chinese labor employed in similar capacities and where the cost of producing the item is principally labor, American railway items which are available for comparison are cheaper, not considering the exchange.

*For the details of this, see the *Far Eastern Review*. May and July 1929.

	Cost of labor per equated track mi.	Man hours of service men per equated track mi.
Nanking-Shanghai	$865.00	11,700
S.H.N.R.	810.00	13,104
Nor. Pacific	426.00	1,414
Seaboard Air Line	425.00	1,477
Central of Geo.	504.00	1,825
Great Northern	554.00	1,439
Burlington	700.00	1,783
Chicago G.N.	770.00	1,993
,, N.W....	791.00	2,239
Milwaukee	700.00	1,783

According to Mr. Mantell :

The actual business done in 1923 was greater than in 1928. These years can be very accurately compared for the reason that the railways were free from Military disturbances.

Conditions in 1923 indicated a railroad that was considerably over-staffed. In a report of this kind of course the question would arise, and it has come up, about the ability of the personnel. For the purpose of comparison I will disregard over-staffed railways in 1923, and compare 1923 with 1928 on a basis of effort expended.

The Nanking-Shanghai Railway reflects the following conditions.

1923 11,035,370 passengers were carried.
1928 10,661,405 ,, ,, ,,

Of the total revenue as between passenger and goods, passenger revenue represents 83 per cent. in 1928.

Revenue Received per Passenger Kilometre.

Increased 31 per cent. in 1928 over 1923
Average Haul Per Passenger.
Increased 22 per cent. in 1928 over 1923.

There was an increase of 18 per cent. in passenger kilometres run in 1928, which was not performed to reduce overcrowding of trains, as the figures show that the average passengers per train kilometre was practically the same.

It is apparent that the increased revenue was due almost entirely to increased passenger fares, and increased haul per passenger, and does not represent an increase in the passenger business of the railway.

Goods Traffic.

1923 354,610,798 ton kilometres were handled.
1928 272,450,274 ,, ,, ,, ,,

There was an increase in 1923 over 1928 of 30 per cent. in ton kilometres handled.

In spite of the fact that the same amount of passenger business was handled and a heavy reduction in the freight business, the number of employees on the pay roll during this period increased 19.5 per cent.

There is a very complicated wage schedule in effect on the above railways which should be modified by simplification of rules and wage scales. The wage scale will be dealt with separately. It would be useless to compare the operation of this railway with anything approaching a modern scale. Inefficiency of management is so clearly reflected; up-keep neglected; and practically no effort exerted to create new business, particularly goods business, for both railways.

In spite of these conditions, the rates charged on this railway are exceptionally high :

There are four classes of passenger rates on the Nanking-Shanghai Railway. The 1st class rate is based on 5.93 cents per mile.

On American Railways the 1st class fares are based on 3¼ to 3¾ cents per mile.

These railways have not been developed in a manner in which they should have been for economic administration, transportation, and development of new business, particularly goods business, and establishment of rates to meet the conditions of the traffic, or in other words, to some extent what the traffic will bear.

The question of double-tracking this line has long interested railway engineers and the public. Mr. Mantell's comment on the subject is as follows :

Grading and bridge work was completed many years ago between Shanghai and Soochow, a distance of 86 kilometres.

This involved a capital expenditure of aromd $800,000.

It is difficult to understand expenditures of this kind which were not warranted at the time and to have permitted these bridges to remain unused these many years.

The bridges are now too light for recommended wheel load.

There is no necessity for double tracking this railroad at the present time. The statement of nine years' business would not indicate a necessity for doing this for the next 10 years.

It is believed, however, that with intelligent management and proper rates, the traffic of the railway can be developed, as well as the traffic from the North with installation of car ferry service at Nanking. Then there will be a necessity for double tracking in the next seven or eight years.

The business on the road, however, can be increased by the establishment of the Nanking-Pukow Ferry.

The direct line of the railways between Shanghai and Peiping is broken at Nanking on account of the Yangtze River. It is fairly easy to estimate that 25 or 30 years will go by before a bridge could be considered preferable to a bridge in the vicinity of Nanking. The absence of physical connection at this place constitutes a very serious defect in the railway system as a whole, and under authorization from the Ministry plans are being sent from America showing methods and effect in crossing the Mississippi which in many respects is similar to the Yangtze.

Summarizing the question of locomotive performance, Mr. Mantell says :

It is to be noted that the total passenger, goods and mixed kilometres run in 1923 for the Nanking-Shanghai Railway was 8.8 per cent. more than in 1928, while service, assisting, light and shunting kilometres were 72.2 per cent. more in 1923 than in 1928. There was, however an increase of 28,012 tons, or 41 per cent., of coal used in 1928 over 1923, amounting to an increase cost of $495,895.

The discrepancy in the performance of the locomotives of the Nanking-Shanghai Railway led to a most painstaking study of the coal problem. Mr. Mantell found :

There is a tremendous waste of coal on the part of firemen in stoking locomotives. The firemen have evidently never been instructed on scientific firing. In talking with Locomotive Division Superintendents this was confirmed. From 17 to 25 shovelfuls of coal are fired before closing the fire-box door. The firemen, as well as some of the division Superintendents, have no idea in regard to grate draft, fire door draft and creation of strong pressure drawing fine coal through the flues clogging up front end, etc. Scientific firing, combustion, burning of gases, is not practiced. There is also a lack of appliances which could be installed for about $800.00 per engine which would save considerable fuel.

There is an estimated waste of from 15 to 20 per cent. in fuel due to lack of proper practical instruction of firemen.

Mr. Mantell also found inefficiency in the management and repairs of locomotives : He says :

With the large amount of money expended for Superintendence and excess labor each year, there has been very little money expended on new machinery, tools, etc., during the past several years.

The shop buildings and general arrangement are susceptible to re-arrangement and improvement without a large expenditure of money and which will provide for overhauling from 13 to 15 engines per month. This compares with four to five engines per month at the present time.

Mr. Mantell's discussion of the question of sleepers and rails is of especial importance because it affects the life of the railway.

For the nine years ending 1928 inclusive, $2,369,376 was spent on the Shanghai-Hangchow Railway for sleepers. This line is equivalent to 182 equated track miles. It is noted that 17 per cent. sleepers were renewed each year for nine years, or 153 per cent. were renewed during this period.

Inspection of the Hangchow Railway does not show this heavy renewal of sleepers each year. Inspection, however, develops the cost of the heavy renewal was due to the poor judgment used in purchasing of sleepers.

From 1921 to 1924, 19¾ per cent. Japanese Soft wood. 14¼ per cent. Mixed Chinese Hard Wood and 44¼ per cent. Tasmanian Soft Wood were applied without treatment, these sleepers having a life of only three or four years.

From 1925 to 1928, 61 per cent. Orogon Soft Wood and 39 per cent. of a poor quality Jarrah were applied without treatment.

This Railway should be easily maintained on an 8 per cent. sleeper renewal per equated track mile basis if a proper quality of timber was purchased similar to first class Jarrah that has been noted in the track here and there.

These sleepers being purchased at approximately $6.50 a piece, with an average life of 14 to 15 years, the total average cost would have been $162,786 per year, against the average of $263,264 that was expended. This is calculated on an 8 per cent. renewal basis.

It is hard to conceive general conditions as outlined when one compares figures like these with the main track sleeper renewal on the Nanking-Shanghai Railway of a little over 2 per cent. per year during the past nine years.

It is clearly indicated that there is an excess $100,000 per year uselessly spent on the item of sleepers, which would have more than paid for a proper maintenance of sleeper renewals as well as the installation of a modern Creosote treating plant.

There have been practically no new rails laid. The most ordinary track tools, such as track jacks are only available in a few gangs.

These Railways have been in operation for twenty-one years and the rails are getting thin here and there for safe operation, particularly with larger motive power units, and it will be necessary to develop a consistent programme to take care of rail renewals and the renewal of sleepers which are badly needed on the Nanking-Shanghai Line.

Mr. Mantell's recommendations as regards new rails and sleepers are as follows :—

Chinese standard rail section should be increased to 90 lbs. per yard.

The sleepers and rail conditions are not good on the Nanking-Shanghai Railway and in order to get a start on the rehabilitation of this line, at least 20 per cent. or not less than 104,790 sleepers should be put in next year. This will only provide for a little more than two new sleepers per rail length of equated track mile. In five years full renewal will have been made and this Railway can then go on a 7 or 8 per cent. renewal basis per equated track mile. Safety conditions demand this as a minimum requirement.

On the Shanghai-Hangchow and Ningpo Railway it is not necessary to provide over 8 per cent. per equated track mile for sleeper replacements. As the rail on both these lines will be practically worn out by 1933 or 1934 and some of it is now below safety factor, a constructive program should be worked out to provide for at least 8 per cent. renewals of main track rail, using the better class of rail released for sidings, etc. This only provide for a slow process of rehabilitation. The permanent way labor waste if reduced and other savings that can be effected by ordinary methods of management will more than offset increased expenditure incidentals to renewal of new sleepers and rails.

The following summarizes Mr. Mantell's conclusion :—

The Nanking-Shanghai Railway and the Shanghai-Hangchow and Ningpo Railway have outstanding obligations on the property of *Mex. $33,865,209* and *Mex. $27,629,807*, or a total of *Mex. $61,495,016*. At this time it is hard to conceive where this amount of money was ploughed into the above property. With the enhancement of value of water-front property at Woosung, Markham Road, and other places it is believed that in a short time physical valuation of the property would not be considered too high.

While the operating Expenses to Operating Revenue on the Nanking-Shanghai for the year 1928 is slightly over 62 per cent., it is important to point out that approximately 23 per cent. of the 1928 operating revenue represents interest on outstanding obligations for the above railways.

Seventy per cent. of the above interest could be saved on these railways, based on 1928 figures, with efficient management and supervising staff, which can be brought about by re-organization. In making this approximate estimate, personnel equation of the working staff was carefully considered.

The saving in expenses that should be effected are as follows :—

Fuel, N-S.R.		$495,896	
S-H-N-R.		183,661	679,556
Overstaffing of different Departments	N-S.R.	675,229	
	S-H-N-R.	379,452	1,054,681
Improper Purchase of Sleepers ...			46,514
Excess Ballast Used			21,250
		Total	$1,802,001

A Summary of the Report of the Shanghai Customs 2½% Surtax Treasury Notes Sinking Fund Commission

May, 1927—December, 1929

FROM May, 1927, the time of its organization, to the end of 1928 the Shanghai Customs 2½ per cent. Surtax Treasury Notes Sinking Fund Commission had in its custody the sinking funds for the following five issues of the Chinese National Government notes and bonds :

1. First Issue, Shanghai Customs 2½ per cent. Surtax Treasury Notes
2. Second Issue, Shanghai Customs 2½ per cent. Surtax Treasury Notes
3. Rolled Tobacco Tax Treasury Notes
4. Rehabilitation Short-term Bonds
5. Seventeenth Year Short-term Currency Bonds (1928)

A comprehensive report on the working of the Commission was made for the information of the public at the end of 1928.

There are six other issues of the government notes and bonds the sinking funds of which have also been entrusted to the care of the Commission since 1929. They are :

6. Seventeenth Year Long-term Currency Bonds (1928)
7. Eighteenth Year Famine Relief Loan (1929)
8. Eighteenth Year Troop Disbandment Loan (1929)
9. Second Issue, Rolled Tobacco Tax Treasury Notes
10. Eighteenth Year Customs Revenue Treasury Notes (1929)
11. Eighteenth Year Troop Reorganization and Disbandment Loan (1929)

Up to the last day of 1928 the above mentioned 11 issues were served as follows :—

1. Redemption completed by 30 payments of principal and interest on the First Issue of the Shanghai Customs 2½ per cent. Surtax Treasury Notes
2. 24 payments of interest made on the Second Issue of the Shanghai Customs 2½ per cent. Surtax Treasury Notes
3. 21 payments of principal and interest made on the First Issue of the Rolled Tobacco Tax Treasury Notes
4. 3 payments of principal by drawings and 3 payments of interest made on the Rehabilitation Short-term Bonds
5. 2 payments of principal by drawings and 2 payments of interest made on the 17th Year Short-term Currency Bonds
6. 2 payments of interest made on the 17th Year Long-Term Currency Bonds
7. 2 payments of principal by drawings and 2 payments of interest made on the 18th Year Famine Relief Loan
8. 2 payments of principal by drawings and 2 payments of interest made on the 18th Year Troop Disbandment Loan
9. 9 payments of principal and interest made on the Second Issue of the Rolled Tobacco Tax Treasury Notes
10. 7 payments of principal and interest made on the 18th Year Customs Revenue Treasury Notes
11. 4 payments of principal and interest made on the 18th Year Troop Reorganization and Disbandment Loan

For the information of the public, the terms of the foregoing government loans as well as the receipts and disbursements of their sinking funds are given in the two tables attached hereto.

SUMMARY OF RECEIPTS AND DISBURSEMENTS OF SINKING FUNDS ENTRUSTED TO THE COMMISSION UP TO DECEMBER THIRTY-FIRST, NINETEEN HUNDRED AND TWENTY NINE.

Issue	Sinking Fund Received	Principal and Interest Paid	Balance
	$	$	$
1st Issue, Shanghai Customs 2½% Surtax Treasury Notes ...	35,455,000.00	33,255,000.00	2,200,000.00
2nd Issue, Shanghai Customs 2½% Surtax Treasury Notes...	7,296,000.00	7,296,000.00	—
1st and 2nd Issues, Rolled Tobacco Tax Treasury Notes ...	20,779,164.55	17,943,760.00	2,835,404.55
Rehabilitation Short-term Bonds	12,648,484.43	12,068,000.00	580,484.43
17th Year Short-term Currency Bonds (1928)	6,067,813.01	4,464,000.00	1,603,813.01
17th Year Long-term Currency Bonds (1928)	1,406,250.00	1,125,000.00	281,250.00
18th Year Famine Relief Loan (1929)	1,380,000.00	1,380,000.00	—
18th Year Troop Disbandment Loan (1929)	6,666,666.67	2,500,000.00	4,166,666.67
18th Year Customs Revenue Treasury Notes (1929) ...	5,600,000.00	5,600,000.00	—
18th Year Troop Reorganization and Disbandment Loan (1929)	4,730,600.00	4,730,600.00	—

RAILWAYS

RAILWAY ON SAKHALIN.—The construction of the first railway on Sakhalin Island and the building of a new port at Alexandrovsk, Sakhalin, of the type of Portland, Oregon U.S.A., will commence during February. American engineers are proceeding for this purpose from the United States to Alexandrovsk. These engineers have taken part in the rebuilding of the Portland port in 1909-1910.

NEW HSIACHIUTAI-YAOMEN LINE.—Gov. Chang Tso-hsiang has decided to build a new railway from Hsiachiutai on the Kirin-Changchun Line to Changchiawan or Yaomen on the C.E.R. Southern Section, and to have instructed Chief Engineer Chang Kuo-hsien to prepare estimates therefor in secret.

The new Hsiachiutai-Yaomen line will be 80 odd Chinese "li" long and will cost $3,000,000 in Kirin large dollars. For surveys and construction, the experts of the Kirin-Hailungcheng Line are to be employed. The construction is to be finished within 4 months after the work is started.

CANTON-HANKOW LINE WILL BE COMPLETED.—It is announced at the Ministry of Railways that with surveying of the Chuchow—Shuichow section of the Canton-Hankow Railway completed and the impending issue of the Canton-Hankow Railway Reorganization Loan, construction of this unfinished section of the line will be started this year. The Ministry of the Interior has notified the provincial governments of Kwangtung, Honan and Hupeh that any land taken from private owners for the laying of the tracks and other purposes will be paid for by the Government.

JAPANESE RAILWAYS PLAN TO ELECTRIFY ROUTES.—The Japanese Government Railways is planning to electrify portions of the Government road, between Tokyo and Yokosuka, Kozu and Atami, Ueno and Abiko, Yokohama and Hachioji, Tachikawa and Asakawa, Kyoto and Nara, Tennoji and Umeda, and Otsu and Akashi.

To that end, a special committee in the Railway Office is working out the details of the plan, which when it materializes, is expected to react considerably on the passenger traffic of the existing interurban lines operating in and around the Kanto and Kansai districts.

Among the principal lines expected to be more or less affected by the proposed plan of the Government Railways are the Keihin Densha, Shonan Densha, Tsukuba Rapid Transit, Tobu Tetsudo, in and around Tokyo; the Hanshin, Hankyu, Keihan, Shinkeihan, Daiki and Nara interurbans in and around the Kansai district.

Of the proposed electrified routes, the sections between Tokyo and Yokosuka and between Kozu and Atami have already had overhead wires installed.

PUBLIC WORKS

LARGEST LIGHTHOUSE IN CHOSEN.—The wreck of the s.s. *Siberia Maru* on the Moji-Dairen line off Oyake Island, one of a group of islands known as Daikokusan Gunto, last summer, struck shipping circles so much that the Government of Kwantung Leased Territory, the Osaka Shosen Kaisha, and the Japan Seamen's Union approached the Overseas Affairs Department as well as the Government-General with a request to erect a lighthouse there, and the Communications Bureau decided to erect one on Koe Island, thirty nautical miles off Oyake Island, at a cost of Y.200,000 to illuminate an area within a radius of thirty nautical miles and equipped with a fog signal and radio apparatus. It is claimed it will be the largest lighthouse in Chosen.

NEW WHARVES TO BE GIVEN SHANGHAI.—New wharves and godowns to provide additional shipping facilities in the port of Shanghai will be built in the district between Woosung and Yangtzepoo, center of the proposed Greater Shanghai city, according to plans formulated by the harbor bureau of the special municipality of Shanghai.

An extension of the Shanghai-Nanking railway line to the new center will also be constructed so as to facilitate transportation of cargo direct from steamers to railway wagons.

CONSTRUCTION OF HAKATA HARBOR, JAPAN.—According to a report from Consul Henry B. Hitchcock, at Nagasaki, the improvement of Hakata Harbor (Fukuoka) is now under way. The difficulties in the way of the project have been not so much technical as financial, and while it is said that no real construction work can be undertaken until larger funds are available, the assignment of engineers to the work by the home department and the surveying now being undertaken indicate that the project is ultimately to be carried through. The work at present contemplated involves the building of a breakwater 750 feet long (finally to be nearly 4,000 feet long), considerable dredging to clear a depth that will permit vessels of 10,000 tons to enter, and some filling in. In addition, it will be necessary to construct a relatively large number of caissons for the foundations.

AMBITIOUS PLANS FOR RECONSTRUCTION OF NANKING.—Plans for the reconstruction of the capital into a most-up-to-date city have been drawn up by the Metropolitan Reconstruction Commission. According to these plans the work of the remodelling of Nanking into a modern city is to be completed within a period of ten years. The following is the estimate of the funds to be devoted for construction purposes:

	Tls.
The Historical Museum and the temple for the sages	500,000
The Kuomintang Headquarters	10,000,000
The Central Library	2,000,000
The Central College of Arts	2,000,000
The Administrative Council and the Chief Executive Office	8,000,000
The Supervisory Council	2,000,000
The Examination Council	2,000,000
Each of the 8 Ministries	500,000
The Memorial Pagoda	2,000,000
The Gate of the Nation	500,000
The Aerodrome	1,000,000
Road building	40,000,000
Draining system	2,000,000
Total	80,000,000

HULUTAO HARBOR.—A petition recommending the immediate starting of conservancy work on the upper reaches of the Wei Ho, the main east-to-west waterway in Shensi, by the Central Government has been jointly submitted to the Executive Yuan by the Shensi Guilds in Peiping and the Capital. The proposal recommends that a sum of $2,000,000 from the returned Boxer Indemnity Fund should be reserved for meeting the conservancy expenses and that the famine refugees and the unemployed in Shensi be mobilized for the construction work. The memorandum has been referred to the Ministries of Communications, Finance and Railways for joint consideration.—*Kuo Min.*

Work on the construction and expansion of Hulutao, island off the eastern coast of Liaoning, near the Gulf of Liaotung, into a modern commercial center, will be started in the next month, according to a plan formulated by the North-Eastern Communications Committee. The completion of the proposed construction works, it is expected, will greatly facilitate shipping and export of the special products of Manchuria and Mongolia.

The Committee is also understood to be considering the development of the harbor of Newchwang and the building of wharves, godowns and other shipping facilities there. Surveying of the harbor has already been started and construction is expected to be commenced in March.

A motor-road of about 480 li (160 miles) in length connecting Heiho, on the North-eastern Heilungkiang border, and Nunkiang, an important city east of Tsitsihar, was recently completed by the Heilungkiang Provincial Department of Reconstruction and will shortly be opened to traffic.—*Kuo Min.*

SHIPPING AND SHIPBUILDING

JAPANESE MOTOR SHIP PROGRAM.—According to reports received, the Mitsui Bussan Kaisha, which owns eight motor ships and nearly 40 steamers, proposes to replace the steamers by motor ships within the next 10 years. The programme, which is at present tentative, involves the construction of several oil-engined vessels of large size for the Pacific route and a number of smaller ships for the Chinese coastal service.—*Motor Ship.*

SMALL VESSEL FOR THE EAST ASIATIC COMPANY.—The East Asiatic Co. has ordered from the Nakskov shipyard a passenger-cargo vessel of 3 200 tons d.w.c. High-speed twin-screw Burmeister and Wain machinery will be installed totalling 3,000 i.h.p. The engines will be of the trunk piston type and will be supercharged, running at 170-175 r.p.m. for full output. They will have six cylinders each, 500 mm. diameter, with a piston stroke of 900 mm.

The length of the ship b.p. is 330-ft., the breadth 48-ft. 9-in. and the depth 29-ft., the draught loaded being 17-ft. 3-in. The cubic capacity (bales) is 200,000. There is accommodation for 12 first-class, 22 second-class passengers, and 1,200 coolies can be carried.—*Motor Ship.*

TWO N.Y.K. MOTOR LINERS.—Two motor vessels under construction for the Nippon Yusen Kaisha, the *Hikawa Maru* and the *Heian Maru*, were launched recently. The former is being built by the Yokohama Dockyard, where a sister ship is under construction. The *Heian Maru* has been launched by the Osaka Shosen Kaisha, and both vessels are 510-ft. long, with a beam of 66-ft. and a depth of 41-ft. The draught is 30-ft. 2½ in. Double-acting four-stroke machinery built at Copenhagen by Burmeister and Wain will be installed, comprising in each case two engines developing a total of 11,000 b.h.p. They have eight cylinders, 680 mm. bore with a piston stroke of 1,600 mm., and run at 110 r.p.m.

The *Hikawa Maru* will be placed on the N.Y.K.'s Seattle-Orient service, and the *Heian Maru* will trade on the Orient-California-South American West Coast service. Both ships will maintain a speed of 16 knots.—*Motor Ship.*

NEW ORIENTAL MOTOR CARGO VESSEL "KOTA PINANG."—On November 23 the motor cargo vessel Kota Pinang, building for the N. V. Rotterdamsche Lloyd, was launched from the yard of the Netherland Shipbuilding Company (Nederlandsche Scheepsbouw Maatschappy), at Amsterdam.

The principal dimensions of this vessel are as follow:—

Length overall 464 feet 6 inches; length between perpendiculars 448 feet 4 inches; breadth 60 feet 6 inches; and depth 33 feet 6 inches. The carrying capacity is 9,500 tons.

The ship is propelled by a "Fyenoord M.A.N." motor of 5,200 b.h.p., giving the speed of 14½ miles on her trial trip. Although a cargo vessel, the *Kota Pinang* has a small accommodation for passengers, consisting of a dining saloon, a smoking room, and nine staterooms with two berths each. Further, the vessel has been arranged for the carriage of about 2,000 pilgrims.

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

APR 29 1930

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遠東時報

NEW SHIPS ON THE PACIFIC

JAPAN'S TRADE IN CHINA

By George Bronson Rea

THE NEW SINO-JAPANESE TARIFF TREATY

By George E. Sokolsky

CHINA'S GREATEST REQUIREMENT: PEACE

A Report by Mr. T. V. Soong

Vol. XXVI March, 1930 No. 3

SHANGHAI, PEKING, TOKYO AND MANILA

The Hulutao Port Development Project

[The following authoritative article on the Hulutao Project arrived too late for inclusion in the account of this enterprise which we published last month. It is now being published because it contains data elsewhere unavailable]

ONE of the most important enterprises that the National Government has recently proposed to undertake is the development of Hulutao into a commercial port. The Chinese people have long been cherishing the hope of having a port entirely of their own in the Gulf of Pechili, particularly in Manchuria. If the present scheme is to be successfully carried through, this aspiration will be realized before long. Among the harbors in this region, Hulutao possesses many excellent features.

As early as 1910 work was started to improve the harbor; but owing to various complications, it was suspended. But so far nothing except a portion of the breakwater was completed. The silting of Hai Ho which detracts greatly the usefulness of the port of Tientsin, the building of a network of railways in Manchuria by Chinese independently of the Japanese-owned South Manchurian Railway necessitated a separate outlet, the unprecedented scale of immigrants from the war-torn and famine-stricken districts to Manchuria and the congestion of the port of Dairen during the recent Chino-Russian conflict made the development of this port an immediate necessity. Therefore, not long ago a contract of G.$6,400,000 was awarded by the National Government to the Netherlands Harbor Works Company of Amsterdam to make the necessary improvements. While excessive optimism is not warranted, it is safe to predict that with a certain amount of careful management, the future port can be made to pay for the initial investment and whatever subsequent improvements may be necessary.

Hulutao is a promontory in the northern part of the Gulf of Pechili. It is located in N. 40° 44′ and 121° 1′ east of Greenwich. The west portion of the promontory is connected with the mainland and the south is used for port development depending upon a breakwater (that is to be built) on the south and southwest for protection against wind and tide. The port is ice-free in winter and cool in summer. It is visited mostly by the north wind in winter and southwest wind in summer. The average difference between high and low tides is about 12-ft. The highest tide in summer and the lowest in winter register a difference of 17-ft. The harbor can be made to accommodate deep-draft sea-going steamers without much dredging. It is located very near a coal producing region and is rich in economic possibilities.

The railway connection of this future port is excellent. It can now be reached by a short branch line of seven and a half miles from the Pei-ning Railway (formerly Peking-Mukden) south of the station Lienshan. Later it will be the terminus of the Chinchow-Aigun Railway. Through the system of lines now owned by the Chinese, it can tap practically all parts of Manchuria. A comparison with Dairen, in point of railway connection, to Mukden is as follows:—

	Hulutao	Dairen
To Mukden	301 Kilometers	397 Kilometers

When sufficiently developed the Hulutao Harbor may have a maximum berthing line of 44,000-ft. ample enough for 97 vessels with a length of 400-ft. and an annual cargo tonnage of 6,970,000. But when the present program is completed in five years and a half, there will be a berthing line of 8,800-ft. which is sufficient to accommodate 16 steamers of 400-ft. each. There will be plenty of anchoring space in the harbor. The following are the important engineering details of the project:—

I.—Breakwater

As has been mentioned before, a breakwater is needed to protect the harbor from wind and tide. It will consist of two parts, (1) the southern part of 4,100-ft. long and (2) the southwestern part of 1,000-ft. long.

The Southern breakwater shall be composed of a foundation of pell mell rubble, dumped into a foundation channel, dredged to a depth of 35-ft. below H. Z., upon which will be erected a wall, consisting of concrete blocks for the lower part, which will be prepared on shore, and concrete monoliths for the upper part, built in situation lengths of 60-ft. each, separated by contraction and expansion joints, and with the top at 22-ft. above H. Z.

The blocks are to be placed on a bed of broken stone with concrete bags on both sides, in sloping bond at an inclination of 1 : 3.

Upon the monolith will be placed a reinforced concrete parapet on the seaward side, with contraction and expansion joints every 60-ft. and with the top at 30-ft. above H. Z. The rubblemound foundation is extended on both sides of the wall to form a berm covered with ½ to 1 ton stones, on the seaward side concrete blocks are placed on top of same.

The eastern part of the breakwater over a length of 1,000-ft. will be built without a parapet and with the crest at a level of 18-ft. above H. Z.

The western part over a length of 2,100-ft. will be of similar but lighter type and a backfilling with pell mell rubble covered by a layer or quarry spalls shall be provided for.

The top of the monoliths shall be at 22-ft. above H. Z. and that of the parapet 30-ft. above H. Z.

The east end of the breakwater shall be supported by a laisson made of concrete blocks, the slope of the rubblemound will be flattened and concrete blocks placed on the inner and outer berms.

(2) The south-western part will be similar to the most western part of the southern breakwater.

II.—Quaywall

The quaywall, with a total length of 3,700-ft. consists of three parts with lengths of respectively 800, 1,800 and 1,700-ft. At the eastern end of the southern quaywall a connecting wall will be constructed between the quaywall and the breakwater.

The construction of the quaywall and the connecting wall will be similar to that of the western part of the southern breakwater. The foundation channel shall be dredged to a depth of 35-ft. below H. Z. except where the bottom rock is above this level. The part of 1,700-ft. shall be made with a foundation to a depth of 40-ft. below H. Z. and the lower part of the quaywall to consist of one more layer of concrete blocks. The quaywall will have a coping of concrete with contraction and expansion joints every 10-ft. the face to be protected by fenders of hardwood. Five flights of stairs are to be spared in the monoliths and 20 iron ladders and 5 bollards have to be secured.

III.—Construction Pier

The construction pier consists of a rubblemound with slopes of 1 : 2, and : 1½, and shall have a total length of 900-ft.

A foundation channel shall be dredged over a length of 250-ft. from the end of the depth of 18-ft. below H. Z. The rubblemound consists of pell mell rubble mixed with 20 per cent. of quarry refuse and the material obtained from the excavation Pan Lan Shan and Kao Liang Tou To may be used, the outer slope and the crest shall be covered by stones of ¼ to 1 ton, the inner slope by stones of 2 to 5 cwts.

IV.—Retaining Dikes

The retaining dikes within the harbor shelter situated to the north of the construction pier, shall have a total length of 2,360-ft. and shall consist of a rubblemound of pell mell rubble mixed with 30 per cent. of quarry refuse with slopes of 1 : 2 and 1 : 1 covered by a layer of quarry spalls on the inner slope and by a layer of stone of 2 to 5 cwts. on the outer slope.

The retaining dike to the west of Pan Lan Shan shall have a length of 2,500-ft. and shall consist of a pell mell rubblemound with a seaward slope of 1 to 3 and a berm with a width of 10-ft. at the level of 5-ft. above H. Z. This slope shall be covered by a 5-ft. layer of ¼ to 1 ton stones; the inner slope is 1 to 1½, covered by a 3-ft. layer of quarry spalls.

Above the level of 15-ft. above H. Z. a concrete wall shall be made with contraction and expansion joints every 60-ft. and surmounted by a reinforced concrete parapet from 22-ft. to 27-ft. above H. Z.

At the north-western end, where a concrete wall has already been made up to a level of about 18-ft. above H. Z., over a length of 450-ft., only a seaward slope shall be made, and the concrete wall with the parapet wall shall be made on top of the existing wall.

The retaining dike limiting the reclamation of the mudflat, shall have a length of 2,100-ft. and shall be constructed of consistent clay or mud, the outer slope to be covered with a layer of rubble on a bed of brushwood.

V. Dredging of Harbor Basin and an Entrance Channel

One area is to be dredged to a depth of 27-ft. below H. Z.
One area is to be dredged to a depth of 32-ft. below H. Z.

The entrance channel is to be dredged to a depth of 30-ft. below H. Z., and with a width of 650-ft. in the bottom for a distance of about 2,500-ft. until it reaches a point where the sea bottom is 30-ft. below H. Z., all slopes to be 1 : 2.

VI. Reclamation of Low Grounds and a Part of the Foreshore

The reclamation of a part of the mudflat, the fore-shore and the filling between the breakwater and quaywall shall be done to a level of 22-ft. above H. Z. The material dredged from the harbor basin, entrance channel and foundation channels will be used for this work as well as the material obtained from the excavation of Pan La Shan and the Kao Liang Tou To which will not be required for the construction pier and retaining dikes.

VII. Excavation of Pan La Shan and Kao Liang Tou To

The excavation of Pan La Shan and Kao Liang Tou To shall be done to a level of 22-ft. above H. Z.

As has been mentioned before, the contract time for the above work will take five years and a half ; but it is expected that the harbor will be ready for use long before the time set for the completion of the work probably in two or three years' time from now. While engineers, labor, equipment, material and supplies are to be furnished by the contracting company, the Government on its part has appointed Mr. Y. M. Lin as the Director of the Hulutao harbor work upon whom shall rest the responsibility of checking the work completed by the contracting company to see that it is properly performed, to make the necessary changes in the stipulations of the contract, to make the periodical instalment payments to the contractor and to supervise over sundry other matters.

Dutch Building Many New Vessels for East Indian Trade

The Netherlands merchant marine has been strengthened during 1929 by the addition of 23 steamers of 107,940 gross tons, and 15 motorships of 55,060 tons, while on the other hand, 11 steamers of 36,960 have been sold, broken up, or lost, so that the net addition of steam tonnage, *viz.*, 12 units and 70,980 gross tons, is over 15,000 tons in excess of the new motor tonnage added, the completion of the Holland-Amerika liner *Statendam* having, of course, favorably influenced the share of steam tonnage. Eleven vessels of 38,200 tons were constructed in Netherlands yards, as were 13 motorships of 39,060 tons.

The choice of Netherlands owners appears to be shifting rapidly in favor of diesel tonnage ; at the end of 1929 there were only 14 steamers, of 37,100 gross tons under construction, but 35 motorships of 216,150 gross tons. A substantial share of the diesel tonnage now building is for account of the East Indian liner companies, which have already acquired a very considerable amount of diesel tonnage. This having proved satisfactory, the companies are eager to increase their diesel tonnage.

The Java-China-Japan line has ordered two motorships (7,600 tons gross) and the Koninklijke-Nederlandsche Stoomboot-Maatschappij, who, before the war, employed a number of comparatively small motorships, have ordered a large motorship (8,700 tons) for their Amsterdam-Indies service. The same owners have also ordered three small steamers (1,750 tons) from German builders.

Owners engaged in general trading are sticking to steam tonnage, two steamers of respectively 6,000 and 2,000 gross tons being under construction in the United Kingdom for owners in this class, and the Indian Packet Co., while having placed orders for a considerable number of motorships of between 500 and 900 gross tons, are still preferring steam engines for vessels of moderate size.

The Nederland Steamship Company has taken over from builders the two last units of the *Poelau* class (9,250 gross tons) and has now developed a design for a somewhat smaller "T" type (8,650 tons), the length of which has been increased by five feet, after the advantages of the greater length than provided for in the original design had been proved by model tests at the National Physical Laboratory's experimental tank, Teddington. Seven vessels of this new type have been ordered, and British builders have secured orders for two units ; all are to be propelled by Sulzer engines, and in one case the engine will be double-acting.

Two new passenger motor liners of about 19,000 tons each, ordered in 1928, have been launched. Both vessels will have ten-cylinder Sulzer engines, and have a speed of 18 knots, but while the machinery for one ship is constructed at Winterthur, the other will have Schelde-built engines. The higher speed compared with the previous motor liner *Christiaan Huygens* (17 knots) and with the French-built motor liner *Pieter Corneliszoon Hooft* (15 knots) will enable the owners to reduce the duration of the voyage, but the inability of the French-built unit to keep schedule of the later vessels has made the owners decide to take out her engines, consisting of two eight-cylinder Sulzers of 4,000 shaft h.p. each and cylinders of 760 mm. bore and 1,240 mm. stroke, being the same as for the 10-cylinder units in the latest ships. The increased power and a lengthening of the foreship by eight feet, which is to be carried out at the same time, will increase the speed by about two knots. The oil engines will be installed in cargo units.

The Rotterdam Lloyd has taken over one cargo liner of the *Kota* class (7,200 tons) ; three vessels of this type are still in the hands of various builders in Holland, and one of these is to be fitted with fast M.A.N. diesels and mechanical reduction gearing, a novel experiment the results of which will be eagerly awaited. One of the two new 18,000-ton motor liners has been launched at Rotterdam, the construction of the other is being curtailed, as it will be impossible to bring her out from the builders' yard at Flushing before the new locks at that port are ready. Both vessels will have Schelde-Sulzer diesel engines.

The Holland-Amerika Line flagship *Statendam* is one of the most efficient steamers afloat, her consumption of boiler oil being .61 lbs. per shaft h.p. for all purposes. The owners have now decided to re-arrange the passenger accommodation on the Rotterdam to the Statendam plan.

The last important vessel to be launched in the Netherlands in 1929 was the new motor vessel *Marnix Van Sint Aldegonde*, built by the Netherland Shipbuilding Co., Amsterdam, and christened by H. R. H. Princess Juliana. This ship and her sister, the *Johan van Oldenbarneveldt*, which was launched a few months ago from the same yard, have been designed by Visker & Prins, of the owners' technical staff. They are of 611 feet 10 inches overall length, 74.1 inch molded breadth, and 73.8 inches depth from keel to A deck, their loaded displacement being 21,400 tons. Accommodation is provided for 370 first, 281 second 64 third and 60 fourth-class passengers, while the crew of each numbers 344 hands.

Two Schelde-Sulzer diesel engines of 7,000 shaft h.p. each, will give her a speed of 18 knots. The contract for the two ships was signed on April 30, 1928, the keel of the second vessel was laid on December 8, 1928, and she will be ready to sail on her maiden voyage on October 7, 1930. The first vessel will be ready to sail on her first trip on May 6 next.

The Netherland Shipbuilding Co. has three "T" type cargo motorships ; on the vacated berth the keel will be laid for the motorship *Tjinegara* for the Java-China-Japan line, and of each of these two types of vessel one more is to be laid down as space becomes available.

The Fusenko Hydro-Electric Power Plant

(Continued from page 138).

Other details are similar to those of Power Plant No. 2.

Water wheel necessaries, devices to regulate the water levels, other automatic instruments, and other safety devices, have been equipped. They are of the Dengyosha make.

The generators are of 20,000 kVA. ; 277 r.p.m. ; other specifications are the same as those for Power Plant No 2.

The transformers are of outdoor, oil-cooled, single-phase, 4 units of 6,666 kVA.

The completion of Power Plants No. 2 and No. 3 is expected by October, 1930.

Total Cost of Construction (estimated)

Power Plant No. 1 ..	Y.34,700,000	Transmission Lines..	2,700,000
Power Plant No. 2 ..	4,000,000	Overhead Expenses..	5,000,000
Power Plant No. 3 ..	3,600,000		
		Grand Total..	Y.50,000,000

GRAIN ELEVATORS AT DAIREN.—The announcement that grain elevators are to be installed shortly at Dairen, which will be the first to be used in Manchuria, reminds one that such elevators were planned for the Chinese Eastern Railway and at Egersheld as far back as 1922. For in that year the railway concluded a contract with a large British concern for erection of several of them. On account of the change of management in the C.E.R. and the taking away of Egersheld, the contract fell through. In the meantime the South Manchuria Railway, not to be left behind by the C.E.R., allotted a large sum to be set aside for the installation of elevators, and sent several engineers to Europe, America, and Canada to obtain firsthand knowledge on this subject. When it was learned that the C.E.R. contract had fallen through, the Japanese did not hurry matters, so that nearly five years have elapsed before the first installation has made its appearance. Others are to be installed by the S.M.R. along the railway line and Changchun is to have an installation of large capacity, so as to handle promptly the large quantity of beans arriving from the C.E.R. It is high time that the C.E.R. should give the matter their earnest consideration and earmark a large sum of the yet-to-be-earned railway profits for the purchase of these grain-elevators.

BRANCH RAILWAY FOR CHINKIANG.—To facilitate the transportation of freight into and out of Chinkiang, the Ministry of Railways has decided to construct a branch line connecting the river-front station at Chinkiang with the Chinkiang Customs House. The fund for this construction amounting to about $30,000, will be appropriated from the 1930 surplus of the Shanghai-Nanking Railway.

The merchants at Chinkiang have been greatly inconvenienced by the fact that goods have had to be transported by boat between the Chinkiang Customs House and the present river-front station, and during dry seasons when the water is low, boats find it very difficult to dock at the river-front. It is estimated that more than 100,000 tons of goods have to be re-shipped in this manner every year. If a branch line is constructed along the river-front there will be annual increase of 20,000 tons of goods going into Chinkiang and about 60,000 tons of goods exported from that port.

PUBLIC WORKS

NANKING CITY DEVELOPMENTS.—The first half of the 19th Year of the Republic (1930) will see a number of civic improvements and new constructions started in the capital. The programme of the Special Municipal Government of Nanking provides for the following construction work to be begun early this year:

1.—A modern waterworks system.

2.—Installation of rail-less tram-cars on the Chungshan Memorial Highway and its main branch streets.

3.—Opening of an isolation hospital and a large public recreation ground.

5.—Opening of additional free schools for the poor and night classes for the workers.—*Kuo Min.*

NEW MANILA DREDGE.—The contract for the purchase of a dredging machine to be used by the public works bureau in dredging the Manila harbor and parts of the Pasig river was awarded by Francisco Segado, insular purchasing agents to F. Schichau, local representative of Reither, Ackerman and Company, a London concern, following the recommendation to this effect made by A. D. Williams, director of public works.

The cost of the new dredge is P.410,000. The new dredge will be larger than the old dredge at present being used by the public works bureau in the Pasig river. The contract includes an additional sum of P.60,000 for bringing the dredge from London to Manila.

According to the terms of the contract, the dredge must reach Manila within 100 days from the signing of the contract. The new dredge is powerful and more speedy than the ones now in operation here.

SHIPPING AND SHIPBUILDING

N.Y.K. JAPAN-LONDON PASSENGER LINER.—The *Terukuni Maru*, the first of two similar passenger liners for the service of the Nippon Yusen Kaisha between Japan and London, was launched on December 19 from the Mitsubishi Zosen Kaisha. This ship is of 11,800 tons gross and is 526 ft. long overall, with a beam of 64 ft. and a depth of 37 ft. The draught is 28 ft. 6 ins. Twin-screw oil-cylinder Sulzertype machinery will be installed, constructed under licence in Japan by the Mitsubishi Zosen Kaisha. Each motor will develop 4,800 b.h.p. and have cylinders 680 mm. bore with a piston stroke of 1,200 mm. The revolution speed will be 110 per minute.

Accommodation is provided for 125 first-class, 69 second-class and 60 third-class passengers, whilst 10,000 tons of cargo will also be carried. The trial trip speed of the *Terukuni Maru* and her sister ship *Yasukuni Maru* will be 16.75 knots.—*The Motor Ship.*

WHARF RAILWAY AT NAGASAKI.—The extension of the Japanese Government Railway from the Nagasaki Station to the Dejima Wharf where the "Express boats" berth has just been completed. This extension will be used on the arrival and departure of the N.Y.K. Express liners only—*Nagasaki Maru* and *Shanghai Maru*. On the sailing date of one of these steamers for Shanghai, the express train from Tokyo arriving at Nagasaki Station at 7.30 a.m. will be extended to the wharf, and, when the steamer arrives from Shanghai, the express train that leaves Nagasaki for Tokyo at 2.40 p.m. will start from the wharf a little earlier, and after a few minutes' stay at Nagasaki Station will proceed on schedule time. The new station is called Nagasaki Ko Eki (Nagasaki Port Station), and the office being in the same building as the N.Y.K. Ticket Office, great convenience is afforded passengers, as they can arrange for their further itinerary within the wharf compound.

F. L. SMIDTH & Co. A/S.

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Head Office: 33 Vestergade, Copenhagen *Telegraphic Address:* "Polasmidth," Peiping

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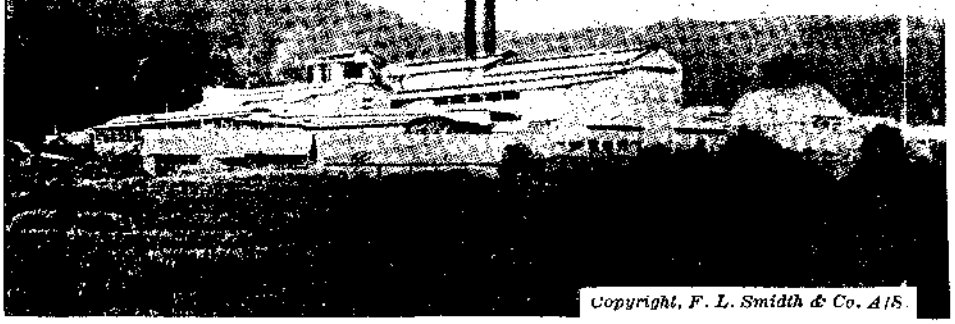

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上海仁記路拾六號

遠東時報

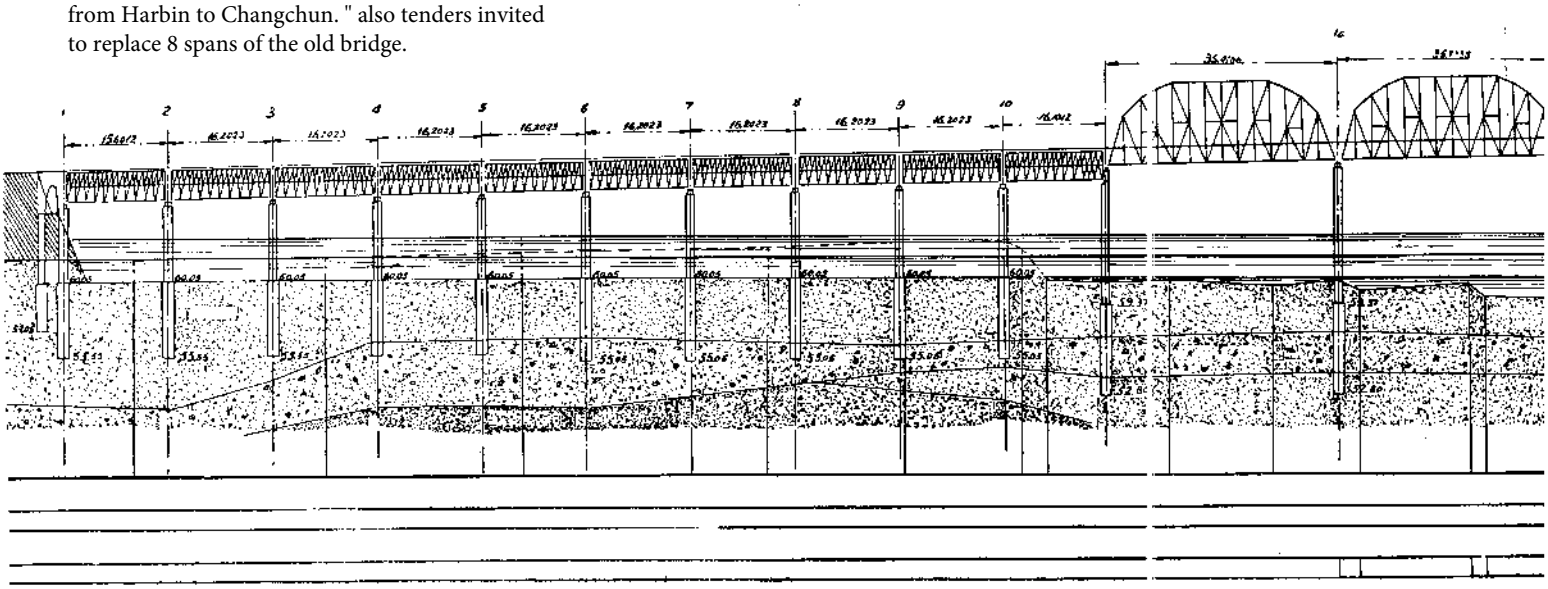
Vol. XXVI | April, 1930 | No. 4

BRIDGE OVER THE SUNGARI RIVER (FIRST

(note; On page 159

"CER has replaced old bridge erected 1896 over the Sungari river on the southern branch line from Harbin to Changchun." also tenders invited to replace 8 spans of the old bridge.

(8 Spans at 35.00 Sajen with Traffic Below and



New Chinese Eastern Railway

Bangkok Memorial Road Bridge

The contract for the supply and erection of this bridge was recently secured by Dorman, Long & Company in keen competition with the leading bridge builders of other countries. It is to be built across the River Chow Phya in the middle of Bangkok to connect the two halves of that city which have a combined population of approximately three-quarters of a million, and its special object is to commemorate the 150th anniversary of the foundation of the city. H.M. the King of Siam, recognizing the unique occasion, personally presented the land on the Bangkok side, as the site selected was situated on his private property. His Majesty also desired to pay half the cost of the project from his privy purse.

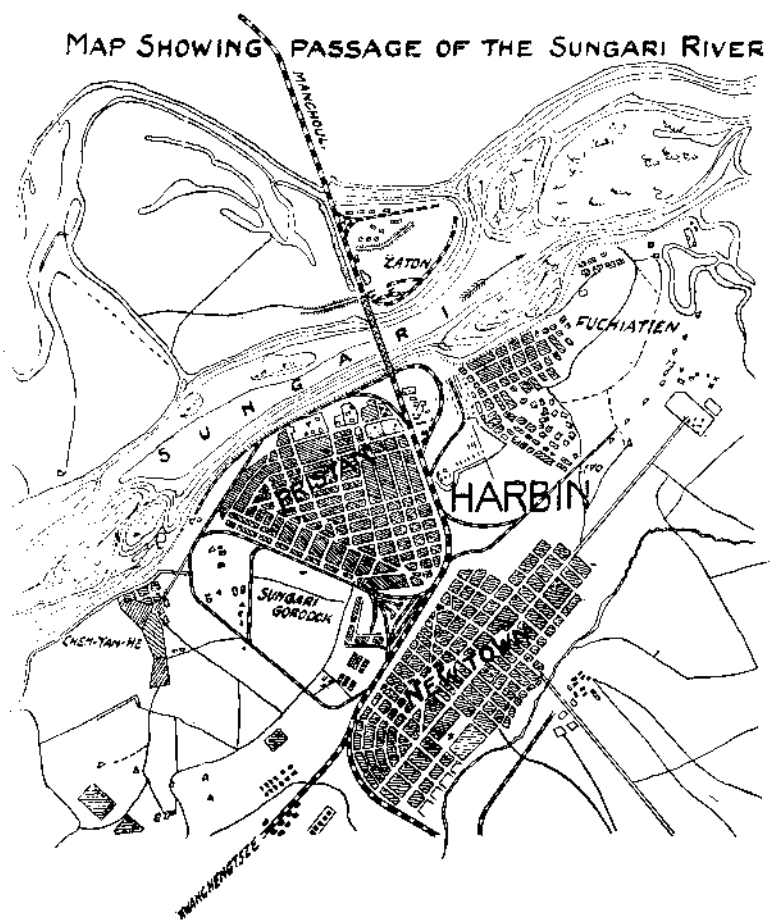
The contract, which was let for a sum of £262,288, consists of the supply and erection of a road bridge approximately 230 metres in length, with a central opening span of the bascule type, giving a clear passage of 60 metres. The roadway is 10 metres wide between kerbs and the bridge also carries two footways each 2.5 metres in width. The approaches from both sides pass through ornamental gardens, and vertical embankments with pontoon landing stages are also provided at either side of the river.

The Consulting Engineers were Messrs. Sandberg, Consulting Engineers to the Royal State Railways of Siam.

The illustrations on the preceding page show an architect's drawing for the bridge and the elevation, plan and layout of the approaches.

From Chakra Bejr road on the East bank the approach is in the shape of a U, and rises about 3 per cent. towards the abutment.

The memorial statue of the 1st King of the Chakri dynasty H. M. Somdej Phra Budha Yod Fá will be placed at the bend of the U. Between the two arms of this approach is a public garden 70 m. wide. There is a bunding wall of reinforced concrete sheet piles along the bank of the river and behind this a promenade runs underneath the bridge and turns on both ends to run outside of and parallel to the arms of the approach and come out at Chakra Bejr Road. The distance from the bunding wall to the front of the abutment is about 19 m. The portion underneath the curved part of this approach is to be made into shops.

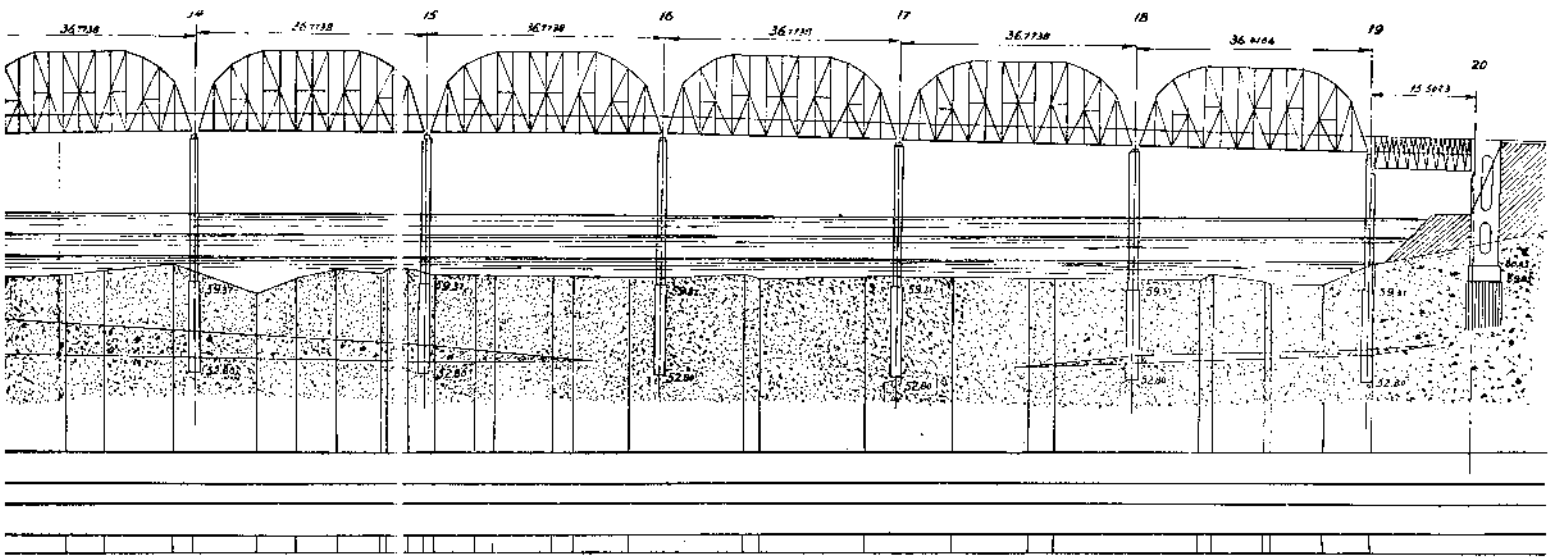


On the West side the approach is a straight one, being along the axis of the bridge. Similar bunding wall and promenade are also to be constructed with two low level roads to meet at the end of the approach as shown in the plan. The ceremony of laying the foundation stone was performed by H. M. King Prajadhipok at the East abutment on the 9th January, 1930.

1. *Superstructure.* — This consists of two fixed steel lattice girder approach spans, each of length 75.25 m. center to center of bearings, and two lattice girder opening leaves having a total length between the tail pin and center line of the bridge each of 38.4 m. providing an opening 60 m. clear between piers. Each of the fixed approach girders is 11.27 m. deep and divided into 10 panels of 7.52 m. The two openings bascule leaves are each 7.62 m. high over the main trunnion and divided into a single panel 7.62 m. long between the main

CROSSING) WITH OPENING OF 445,00 SAJEN

11 Spans at 15 Sajen with Traffic Above)



Bridge Over the Sungari

trunnion and the tail trunnion and five panels of 6.16 m. over the opening. The girders both of the fixed and opening spans are in one line, 11.27 m. apart center to center, giving a clear width of 10.60 m. between steelwork. The girders carry a steel frame floor system upon which will be laid a ferro-concrete floor for the fixed spans and timber for the opening spans in order to lighten the weights of the bascule leaves. The fixed approach spans are supported on the river piers directly on a steel framework embedded in the concrete of the pier and at the shore ends upon cast steel expansion bearings. The bascule leaves rest upon trunnion bearings, carried upon the same framework. The bridge is graded upwards from both ends with a grade commencing at about 3 per cent. at the two abutments, which is reduced to level at the center line of the bridge by a gradual variation.

2. *River Piers.*—Two wide river piers are required to carry the bearings of the fixed spans on the shore side and the trunnions of the bascule leaves on the inner side. The upper portion of each pier is hollow, so as to enable the tail end of the bascule leaf to fold within it upon opening and to accommodate the operating mechanism below the floor of the bridge. For this portion of the pier the concrete in the walls and floor will be water-proofed and the floor arranged with drainage slopes to a sump, in which an automatic, electrically driven pump will be provided, so that any small amount of water entering the pier will be pumped out when it rises to a predetermined level.

The loads from the fixed and moving span bearings are carried on a heavy steelwork frame at a level below this hollow portion, resting on steel grillages built into the concrete walls of the piers. At this point the pier is stiffened by the provision of heavy floor of reinforced concrete.

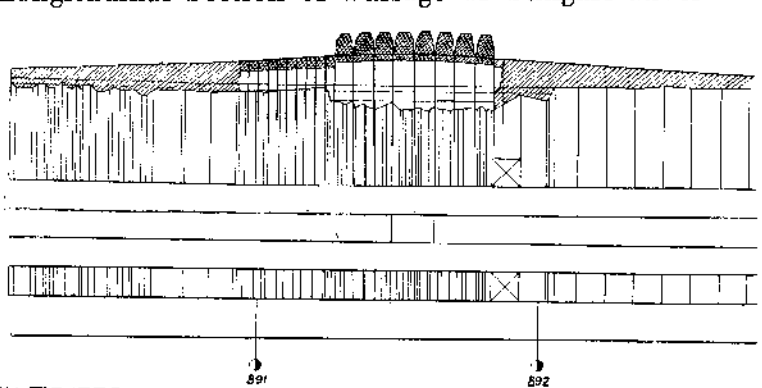
The outside of the pier has vertical walls and is shaped to provide a cutwater at each end up to just above low water, at which level the cutwaters are stepped back to a vertical face. The width of this part of the pier is 10.2 m. and the length over cut-waters 20.00 m. and above the cutwaters 14.00 m. At a point just above the bed of the river, the pier is widened on one side to equalise pressure on the base.

Below the upper hollow portion where the machinery is housed, the pier is formed with large voids, water filled, to reduce base pressure. The outer walls are 1.22 m. thick, with a central stiffening wall of .92 m. These are further thickened at level 15.7 m. just above bed of river, to 1.37 m. and 1.07 m. respectively. The working chamber and about 1.25 m. above it will be filled with solid concrete over the whole area of the base, forming a solid footing about 3.7 m. thick.

A scarcement is provided about ½m. below low water level, allowing for adjustment in the position of the upper portion and its steelwork and mechanism, should there be any slight discrepancy in the exact position of the caisson after sinking. The piers will be sunk by the compressed air method in steel caissons. The walls and floors of the piers will be composed throughout of concrete of four parts of properly graded aggregate of mixed stone and sand of approved quality to one part of Elephant brand cement except in the working chamber seal, which will be 8 to 1. The concrete will be reinforced where required with round bars or old rails. The caissons will be sunk to a level not less than 30 m. M.S.L. and may be sunk deepaer up to a maximum of 33 m. M.S.L. if required.

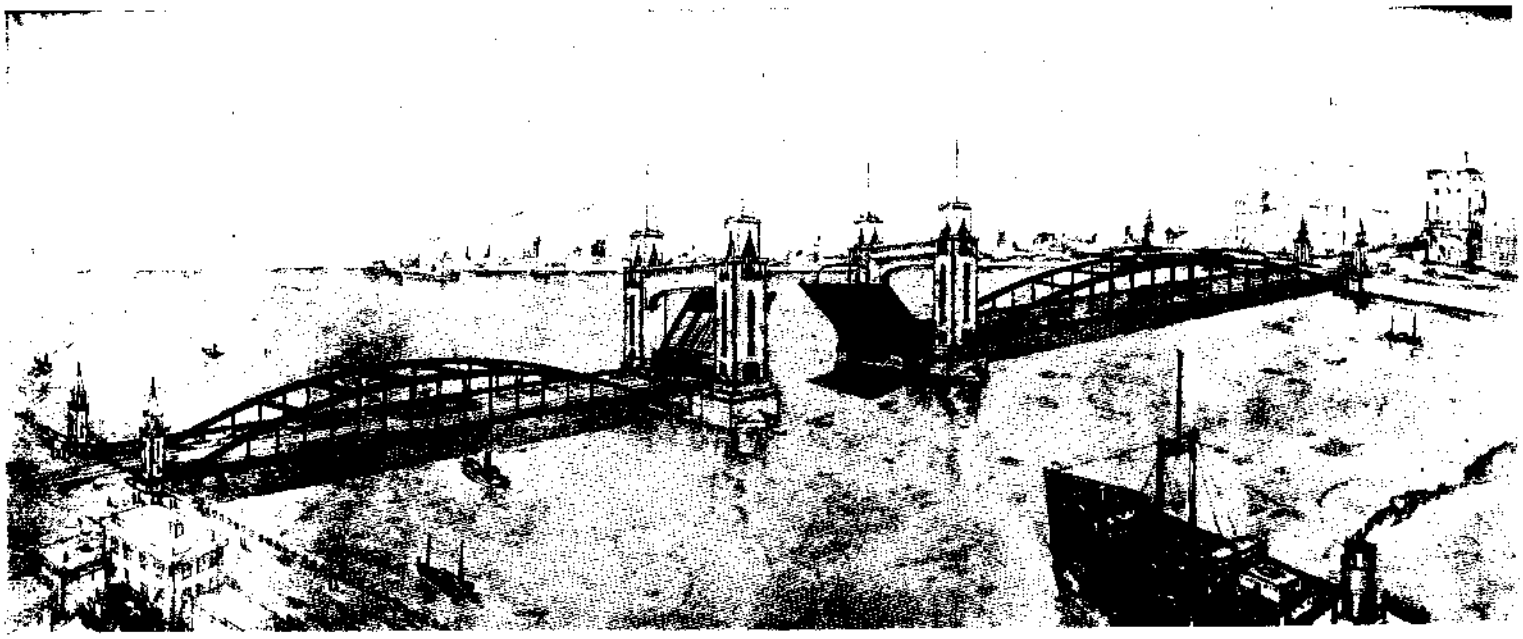
3.—*Abutments.*—The abutments at each end consist of a reinforced concrete wall about 1.22 m. thick, extending across the full width of the bridge under the bearings, designed to carry longitudinal and lateral loads, as well as the vertical loads from the bearings. The wall has a footing of reinforced concrete, forming a cap to a group of Vibro piles, spaced approximately 1.2 m. apart. The pile is assumed to carry a load of 20 tons. A pile test will, however, be carried out and the number of piles rearranged in accordance with the actual test results obtained. The back of the wall is extended upward to carry the end of the reinforced concrete viaduct approach.

Longitudinal Section of Passage of Sungari River



REMARK: FIGURES INDICATED IN SAJEN

1 SAJEN = 7 FEET
1 VERST = 500 SAJEN



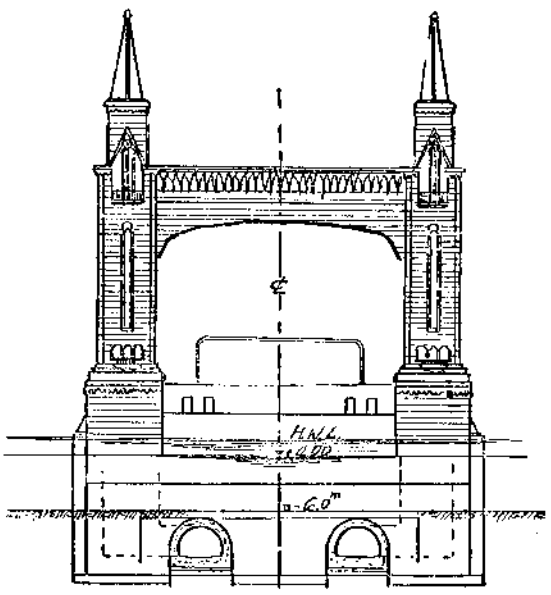
Architect's Drawing of Proposed Bascule Bridge Over the Sumida River at Tokyo Connecting Tsukiji with Tsukishima

4. *Mechanism.*—Operation is electrical by means of a 50 H.P. motor for each leaf, driving through rack and pinion gearing, a pair of circular racks being fixed inside each pier. Both leaves are operated from one cabin situated on the deck of the Eastern pier, a similar cabin being provided for symmetry on the Western pier.

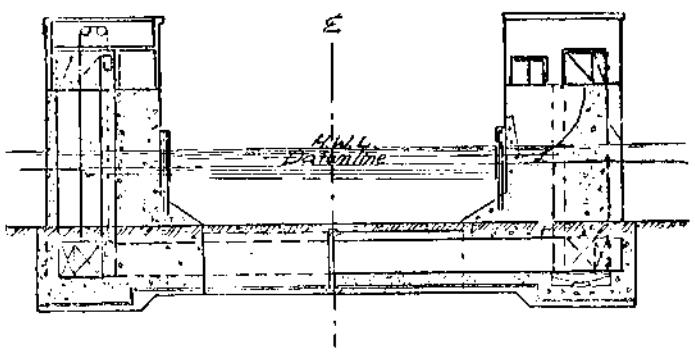
Each leaf rotates, on opening, around a trunnion carried on the steel framing in the pier, and the tail end descends, as stated above, into a hollow portion in the top of the pier, the tail end carrying a counterpoise from a trunnion, designed to balance the dead load of the leaf about the main trunnion. In its closed position, the tail end rests against the steel framework and is securely locked in position by wedges at the end and at the center where the two leaves meet, these being operated electrically.

Two independent brakes for each leaf are provided, operated automatically or, alternatively by hand, and a safety lock for the bridge in the full open position is also provided. Brakes and gear are designed to sustain a pressure of 150 kgs. per sq.m. but the motor and gearing are designed only to open the bridge against a 50 kgs. per sq.m. wind. Barriers are provided across each footpath and the road, near the end of the fixed flanking spans.

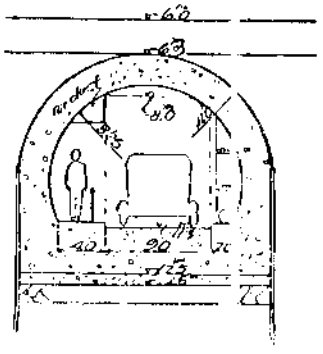
The whole of the mechanism is carefully interlocked in such a manner that each operation necessary to open or close the bridge is automatically performed in the proper sequence and the signals and navigation lights and operation of the barriers are also interlocked with the mechanism. Auxiliary mechanism is provided, by means of a petrol engine on each leaf, in case of breakdown of the main gear. The main gear would open the bridge or close it in about five minutes and the auxiliary gear in about 15 minutes, including time for opening the gates, wedging, etc. Operation would be performed entirely from the cabin on the Eastern pier, but there would be an operator on the Western pier whose duty it would be to close the gates at the end and control traffic.



End Plan of Proposed Bascule Bridge at Tokyo



Plan of Bascule Section Showing Method of Handling Traffic When Open



Automobile Tunnel under Bascule Span

Chinese Eastern Railway Bridge

One of the most important bridge contracts now pending in the Far East calls for the replacement of the Chinese Eastern Railway bridge over the Sungari River at Harbin. Last year the old Chinese Eastern Railway Bridge over the Sungari at Laoshaogow on the Southern line between Harbin and Changchun, was successfully replaced by a heavier structure, under a contract with the Skoda Works, It was planned to proceed immediately with the replacement of the longer bridge over the Sungari at Harbin but political difficulties with Russia compelled postponement of the tenders. As conditions are now stabilized, the Chinese Eastern Railway Administration has issued plans and specifications outlining the main features of the proposed bridge and invited tenders from leading bridge builders. The plans call for the erection of eight spans of silicic steel, 76.8 meters long each, weighing, with footpaths, about 298 tons each, making a total of about 2,385 tons. The contract provides for the delivery of material on the job and its erection on the old piers, construction and of scaffolding for demolishing the old structure and erecting the new spans; disjointing and removing the old spans and upon completion of the job, the clearance of the river of piles and scaffolding and removal of all temporary structures. The contractor is at liberty to devise and follow his own methods in the execution of the job.

Tenders for the contract are to be based on a flat price per metric ton of steel of spans

in place and shall also indicate the total amount, which shall represent full compensation for the completed job.

The first four spans of the bridge from the Harbin side of the river must be replaced not later than March 15, 1931, and the scaffolding removed and the river cleared for navigation before work on the other four spans can be commenced. These must be in place by March 15, 1932, and the entire job completed by September 15, 1932. Six hours time is allowed for the actual replacement of each span, with a penalty of $100 gold for each hour's delay and a premium of $200 gold for each hour saved.

Full specifications and conditions of the contract will be furnished on application to the Chinese Eastern RailwayAdministration at Harbin.

New Bridges in Japan

Latest Practice in Bridge Engineering in Japan

The completion of the Reconstruction Program for Tokyo and Yokohama forces attention to the remarkable progress made by the Japanese engineers in modern bridge construction. When the old bridges over the Sumida River at Tokyo were replaced after the Earthquake in 1923, the Reconstruction Bureau invited the Foundation Company of New York to sink the caissons for two of the most important structures and so well have the Japanese mastered American methods, that in the last four years they have sunk thirty eight similar caissons in various parts of the country without accident. In a paper read before the World Engineering Congress held in Tokyo last November, Mr. Y. Tanaka of the Engineering Staff of the Japanese Government Railways, says that the advancement made in bridge engineering in Japan is due in the first place to the adoption of the methods of Western civilization and later to the incessant efforts of our senior professors and engineers.

"In order to meet the necessities due to the recent construction and improvement works of roads and railways, we have built a great number of bridges to almost all kinds with fixed spans, excepting extraordinary long span bridges, and some types of movable spans. But we aim at continuous advancement, and are anxious to profit by the useful advice and suggestions to be given us by the experts from the different countries of the world.

Standard Live Loads.—For highway bridges and city bridges, the following live loads are specified by the Department of Home Affairs.

For first class bridges:

Uniform human loads;

$$\frac{120\,000}{170+l} \leq 600 \text{ kg sqm for roadway,}$$

$$\frac{100\,000}{170+l} \leq 500 \text{ kg sqm for foot-path,}$$

where l= span length in m;

1—Motor-truck of 12 tons;

1—Road-roller of 14 tons;

Tramway cars to which the bridges shall be subjected. *)

For second and third class bridges, the lesser live loads are similarly specified.

The dynamical effect of the live load or impact is specified as to be considered only for motor-trucks and tramway cars by the formula,

$$i = \frac{20}{60+l} \leq 0.3,$$

where l=loaded length causing the max. stress in m.

For the railway bridges of the Japanese Government Railways, the Department of Railways specifies three kinds of load class; namely, KS-18 (Cooper's loading E-40, metric system), KS-15 (E-33) and KS-12 (E-26), for the first, second and third classes of railway lines, respectively; and also specifies the following impact formula for steel bridges.

$$i = \frac{45}{45+nl},$$

where i—impact coefficient,

l=loaded length causing max. stress in m,

and n—number of tracks.

*) For the new bridges in Tokyo, the Bureau of Reconstruction specified 30 ton electric bogie-cars.

The private railway companies specify usually one of the loadings above mentioned, or the other conventional load system.

In Chosen, the Chosen Government Railways also specify three kinds of load class; namely L-22 (E-50), L-18 (E-40) and L-15 (E-33) for railway bridges.

Materials.—The properties of the principal materials for bridges are specified by the Japanese Engineering Standards, and the allowable stresses of structural steel are generally specified as 1200 kg/sqcm for the primary stresses in tension, 1000-1100 kg/sqcm as max. for compressive stresses, to be reduced according to the slenderness ratio of the compressed members, 900 kg/sqcm for shearing stresses of the plate etc., and as for the concrete of superstructures, the allowable stresses are apt to be specified as 43-53 kg/sqcm for compressive stress etc., on the basis of the field test principles.

As the usual biggest shapes of home-made structural steel, we use 200.-200.19 mm angles, 380 mm channels and 600 mm I-beams; and as bearings or pedestals of bridges, we use a great deal of steel castings. The biggest castings ever used by us weigh 13 tons apiece.

As the structural special steel, the Ducol steel is the only material ever used in this country. Ducol steel which we have used for the main tension members of Eitai-Bashi and Kiyozdu-Bashi, the two largest bridges over the Sumida in Tokio, was made by the Kawasaki Dockyard in Kobe, and had the specified properties given below.

Chemical compositions :—	C. 0.2-0.3%, Si. 0.1-0.2%, Mn. 1.4-1.6%, P. <0.035%, S. <0.03%, Cu. <0.16%.
Physical properties :—	Ultimate strength 6300/sqcm, Yield point 3960/sqcm, Limit of proportionality 3470/sqcm, Elongation for 20cm not less than 18%.

(Allowable stress specified 1700/sqcm for primary stress in tension).

Types of Superstructures and Bridges Lately Built.—(*a*) *Steel Bridges.*—For bridges of short and moderate span length, rolled beams, plategirders, Warren girders, Pratt trusses, solid and braced rib arches are in frequent use, and for highway and city bridges of moderate span length, tied arches and two hinged arches are extensively used.

(*b*) *Reinforced Concrete Bridges.*—Up to about 10 metre span, we use slabs or beams, and for the greater spans, bridges of the rigid frame types, transformed catenary arches, etc.; recent constructions of reinforced concrete viaducts for the elevated railways are also worth noting.

(*c*) Some notable bridges lately built are shown in the accompanying figures.

Substructures.—Piers and abutments of bridges are usually built of concrete or reinforced concrete upon pile foundations, while for the necessities of deep foundations, we use reinforced concrete wells or the pneumatic caissons. In later years, steel piles are also extensively used for foundation works.

The pneumatic method which was introduced by the Bureau of Reconstruction under the supervision of the Foundation Company, N. Y., is now well mastered by Japanese bridge engineers and in these four years thirty eight caissons have been sunk without accident.

Fabrication of Steel Bridges.—We have now a number of first class companies for the fabrication of steel bridges, and their total fabricating capacity is estimated as about 140,000 tons per year. Each of these companies has a steel plated full-size drawing floor, well equipped workshops, with drills, shapers, power riveters, erection yards, cranes, etc.

Erection of Steel Bridges.—The methods of erection of railway bridges have been greatly improved in recent years. Plate girders are usually spanned by the erection cranes or by the rolling out method using proper pilot framings, and the truss girders are spanned by wire cables or by using erection trusses or erection bents. Some actual features of erection works are shown by the figures.

Reinforcement of Over-strained Bridges.—The reinforcementof over-strained railway bridges is a problem of considerable importance in Japan. Plate-girders are usually reinforced by riveting the triangular or trapezoidal reinforcing frames

Electric Mining Locomotive for China

THE locomotives are designed to run on an 18-in. gauge track composed of 25 lbs rails, and to take the supply from overhead conductors at 550/600 volts direct current.

Each locomotive is equipped with two totally-enclosed weather-proof motors rated at 18/20 H.P. on a one hour rating. The drive is transmitted from the motors (one of which is connected to each axle) through gearing consisting of a nickel steel hardened and ground worm and a phosphor bronze worm wheel, giving a reduction of approximately 8 to 1. The casing of the worm gear forms a dustproof housing and the gear is run in an oil bath.

The current is collected from the overhead line by a spring loaded reversible pantagraph collector and conducted through a traction type circuit breaker to tramway type controller. This controller gives seven running speeds in either direction, and in addition two braking notches.

The main frame is of rolled steel built-up section securely rivetted and stayed, provided with machined guides for the axle boxes, and combined buffers and towing hooks giving three coupling positions.

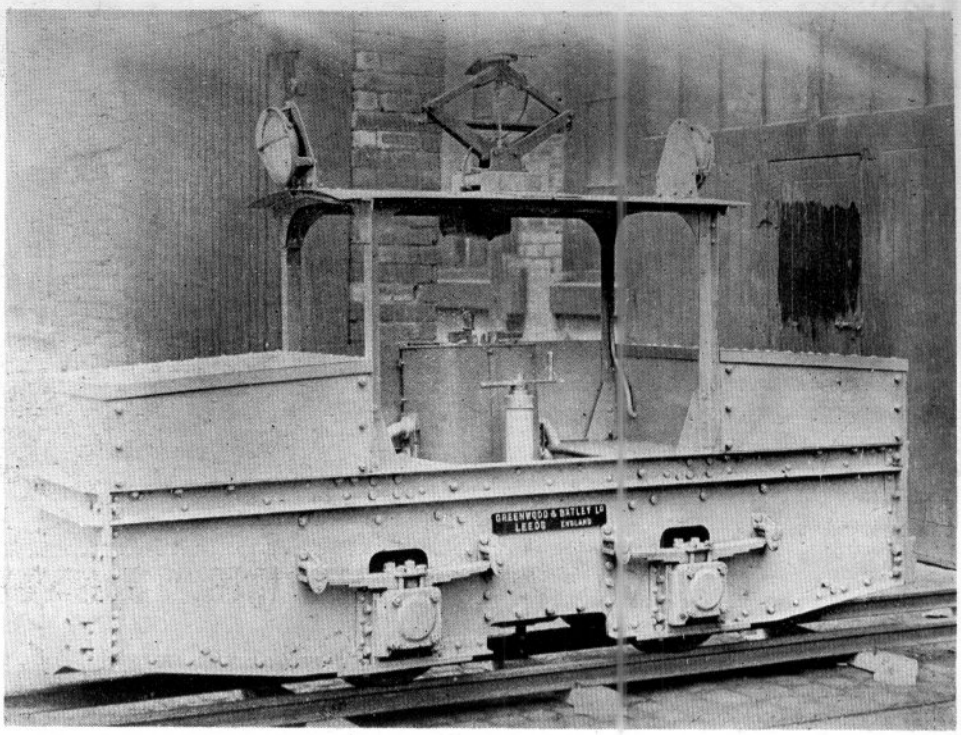
Ball and roller bearings are fitted throughout and all bearings are enclosed in dust-proof housings.

Cast iron shoe brakes are fitted to all four wheels, and operated by a balanced mechanism from a handle situated in the driver's cab.

The driver's cab is centrally situated with seats so arranged that the driver can face in the direction of travel and have an uninterrupted line of vision. Powerful headlights are fitted in the roof of the cab.

The locomotives are designed to give a drawbar pull of 2,000 lbs. when running at a speed of 6¼ m.p.h. On test these figures were obtained and a maximum drawbar pull of 3,000 lbs. recorded. This can in actual practice, be increased by providing ballast in the two containers which are provided for this purpose.

The approximate weight of the locos in running order is four tons and provision is made for carrying an additional one ton of ballast.



Electric Locomotive Made by Greenwood & Batley, Ltd. for a Chinese Mining Company

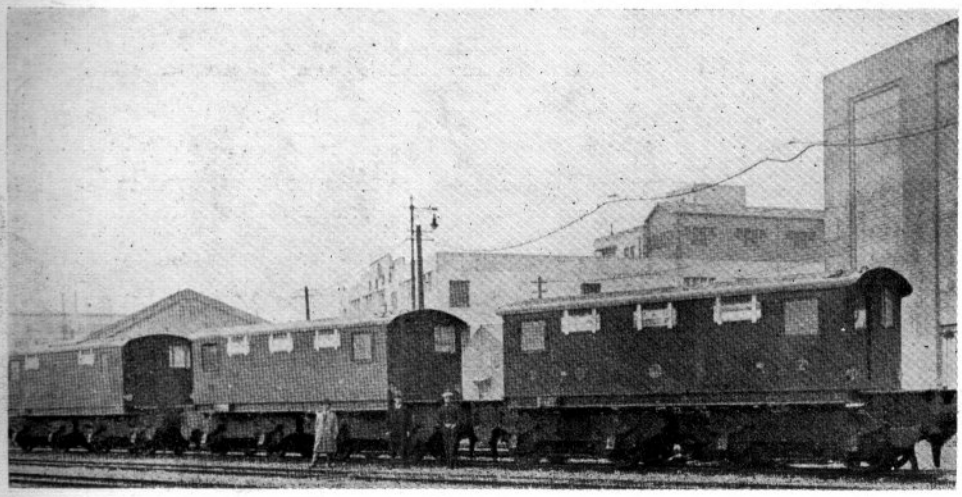
The builders of these electric locomotives, Messrs. Greenwood and Batley, Ltd., of Leeds, England, are also completing a small battery driven mine locomotive for a Chinese mining company.

English Electric Locomotives for Japan

THREE locomotives delivered to the Hokuso Tetsudo K. K. in the spring of this year by the English Electric Company are representative of a line of standard 0-4-4-0 units which that company has developed for service on D.C. systems of 3-ft. 6-in. gauge, operating at 1,200 or 1,500 volts. As will be seen from the illustrations, which show the locomotives ready to be taken to their destination after arrival in Japan, they are of the box cab design with two driving positions. They have a total weight of 35 tons each, and will be operated from an overhead line at 1,500 volts. D.C., from which current will be collected by a single pantograph of the double-pan type which is raised by compressed air and lowered by springs.

The power equipment consists of four self-ventilated motors, connected in pairs in permanent series with a one-hour rating of 120 H.P.; the corresponding speed is 18 miles per hour with a gear ratio of 81 to 15.

Control is effected on this companys' all-electric camshaft system and is arranged to give nine series and six parallel notches. The operating circuits are served by a 120-volt supply obtained from a 2 kW. motor-generator set driven by a 1,500-volt motor. The braking equipment consists of a Westinghouse AMF air-brake, with a D.H. 25 air compressor driven by a 1,500-volt motor, while hand brakes are also provided, with an operating wheel in each cab.



Three English Electric Locomotives for the Hokuso Railway, Japan

Further British Iron and Steel Amalgamation Likely

Although negotiations are now proceeding between the two great Tees-side industrial undertakings of Dorman, Long & Co., and the Furness group of companies for working arrangements which will enable greater economy of production, no definite scheme to secure that end has yet been formulated. There is a feeling, however, that some form of amalgamation may follow the operation of a working arrangement.

A few months ago the undertakings of Bolckow, Vaughan & Co. were absorbed by Dorman, Long & Co., and a scheme for close co-operation between Dormans and the Furness group would include practically the entire iron and steel industry on the Tees-side, with the exception of those works owned by Pease & Partners. Such a scheme would secure the rationalization of the industry in Middlesbrough and district.

Engineering Notes

ELECTRIC LIGHT, POWER AND TRACTION

ELECTRIC WINDING ENGINES FOR JAPANESE COLLIERIES.—Electric winding engines have recently been installed at the Okinoyama, Kamiyamada, and Tadakuma collieries in Japan, all being of the twin-rope haulage type. At the Okinoyama pit the shaft is vertical and only 310-ft. deep. The motor, which runs at 360 r.p.m., normally develops 355 h.p. and drives the actual winder at 43 r.p.m. through spur gearing. The winding speed is 1,240-ft. per min., and with four tubs per cage 382 tons of coal per hour can be raised. At the Kamiyamada mine the vertical shaft is 1,350-ft. deep. The motor in this case has a normal output of 1,220 h.p. at 54 r.p.m. and is directly coupled to the winder. The winding speed is 2,580-ft. per min., the lifting capacity being 150 tons per hour. The working conditions at the Tadakuma mine are somewhat different to those at the other two pits. In this case haulage is effected along an incline at an angle of 45 deg. to the horizontal. The coal is filled underground into a skip, which is hauled to the surface along a rail track, an empty skip descending at the same time. When the loaded skip arrives at the pit head, its contents are discharged into a hopper by means of special tipping mechanism, the coal being then carried by band conveyors to the washing plant, the sorting equipment, etc. The motor, which normally develops 290 h.p. at 350 r.p.m., drives the winder at 29.3 r.p.m. through spur gearing, 120 tons per hour being raised along the 1,320-ft. hoisting track. All three sets of plant are controlled on the Ward-Leonard system; however, to equalize the severe load fluctuations inevitable in winding operations a heavy A.E.G. Ilgner-system flywheel is coupled with the Ward-Leonard motor-generator.

HUGE BAIKAL POWER PROJECT.—Professor Alexandrov, the engineer of the Dnieper Hydro-Electrical Station, now under construction, has advanced a new project involving the building of a power station on the rapids of the Angara River, in the basin of the Lake Baikal.

The Angara Station when completed will, according to Professor Alexandrov, be able to yield 20 milliards of kilowatthours per annum, ten times as much as the Dnieper station, this electrical energy to be the cheapest in the world.

Like the Dnieprostroy, the Angara station will combine the production of energy with the creation of a number of powerful industries, particularly those of colored metals.

The problem of the Angara station is connected with a number of other problems, such as the development of the production of Molibden and Wolfram steel, the exploitation of extensive forests, the development of agriculture on an area of 10 million hectares, and the construction of great railways, the most important of which will connect Verkhneudinsk, Siberia, with Ulan-Bator (Urga), Outer Mongolia, eventually to be continued to Peiping, for the purpose of exporting timber into Mongolia and China.

The colored metal combine, when completed, will be able to produce 150,000 tons of zinc, 50,000 tons of lead and 30,000 tons of copper.

The Angara project is being considered by the Soviet Government in connection with the general plan for development of Siberia.—*Tass.*

INDUSTRIAL

COAL LIQUEFACTION IN JAPAN.—At the Imperial Fuel Research Institute and the Naval Fuel Research Station nearly every kind of coal produced from Chosen, Hokkaido, Karafuto and Joban districts has been studied in respect to its suitability for hydrogenation and it has been found that some kinds of Chosen coal are best. The Chosen Chiso Hiryo K.K. has decided to make a large scale experiment, and has requested a further study of the subject by the Imperial Fuel Research Institute. At the same time, the company has studied the hydrogenation apparatus on a commercial scale, and a patent was procured last year in the name of the Nippon Chiso Hiryo K.K., a sister concern of the aforementioned company. Satisfied by the results, the company has announced that it will erect an experimental plant on a semi-commercial scale in north Chosen, and this plant will be completed by the autumn of this year. It is also learned that the Mitsubishi Mining Company, which owns enormous electric power resources in North Chosen, has decided to use its surplus power for the liquefaction of coal.

NEW GREEN ISLAND CEMENT PLANT.—An entirely new plant is to be installed at the Hok Un works of the Green Island Cement Co., Ltd., at a cost of approximately £270,000 sterling.

The troubles of our technical staff in regard to old machinery, will, however, soon be removed for as you have been informed at the extraordinary general meeting. The new plant has been purchased from Messrs. Vickers, Armstrongs, Ltd., and is to be ready for operation before the middle of next year. The kilns, machinery, etc., will all be of the very latest design and of British workmanship throughout. With the new plant installed and operating, the Green Island Cement Company will be able to market its product at rates enabling it to compete successfully in every market open to us.

The whole plant will be electrically driven and with current supplied under a five year contract by China Light & Power Co. (1918), Ltd.

CEMENT SALES COMPANY FORMED BY LARGE FIRMS.—A plan providing for the establishment of a large joint cement sales company a capitalization of Y.5,000,000 has been drafted and submitted to a general meeting of the Japan Cement Association. The company will consist of 15 Portland cement companies, including the Asano, Onoda, Iwaki, Chichibu, Oita, Hokoku, Ube, Osaka Ceramics, Nanao, Nippon, Mikawa, Electro-Chemical, Toa, Tosa and Asahi.

All cement products for consumption in Japan Proper will be sold through this company, exports come under this category. The head office will be located in Tokyo. The company's directors will be selected from among those of 15 companies and the term of its existence 10 years.

U. S. FIRM TO BUILD FACTORY IN KOREA.—A Y.6,000,000 plant for the manufacture of corn products is being erected in Korea by American interests. Mr. E. L. Phillips, is *en route* to Heijo, Korea, where he will supervise construction of the new factory for the H. K. Ferguson Company. The new plant is to be owned by the Nippon Corn Products Company Limited, which is affiliated with the Corn Products Refining Company of New York, with Mr. E. T. Bedford of New York as President. The plant, which will be completed by the middle of next year, will cover a total area of 15 acres.

RAILWAYS

LIGHT RAILWAY FOR ASHIHO.—The Chamber of Commerce and the local gentry of Ashiho (Achenghsien), a city about 26 miles southeast of Harbin, have undertaken to construct a light railway, approximately 28 miles long, to connect the city with Lalin. The construction expenses which are estimated at $5,000,000 will be advanced from the funds of a corporation to be organized by the interested merchants specially for the construction of the proposed line.

NEW LOCOMOTIVE FOR SOUTH MANCHURIAN RAILWAY.—The South Manchurian Railway Co. has ordered from Sulzer Brothers a Diesel-electric shunting locomotive. It will be driven by a Sulzer eight-cylinder four-cycle Diesel engine, developing 750 B.H.P. at 650 revs. per min. The locomotive will be built for normal gauge (4-ft. 8½ in.), and mounted on two four-wheel driving bogies. The full output of the Diesel engine can be utilized up to a speed of about 25 miles per hour. The maximum speed for the locomotive alone is limited to 37 miles per hour. At a speed of 15 miles per hour the locomotive can exert a tractive effort of about 13,000-lb., *i.e.*, at this speed it can pull a train of 40 trucks of 45 tons each along the level.

ANOTHER NEW RAILWAY.—The Tsitsihar-Keshan line, approximately 204 kilometers in length, will soon be added to the railway system of the Three Eastern Provinces. The total construction cost of $1,200,000 has already been appropriated from the Provincial Treasuries of Heilungkiang and Liaoning Provinces and also from the Peiping-Liaoning Railway Administration.

In addition to the main line, there will also be an extension running in a south-western direction to connect with the Taonan-Angangki Line at the Anganki Station.

Regular passenger and freight services are being maintained at present between Angangki and Taianchang, a distance of 127 kilometers, with rolling stock borrowed from the Peiping-Liaoning Railway, Peking-Mukden Line. The section from Taiancheng to Keshan is still under construction and is expected to be completed before the end of the current year. It is estimated that transportation of agricultural products of the neighboring district alone, especially beans and kaoliang, will be sufficient to net a good profit for the new Line.—*Kuo Min.*

RAILWAY WORKSHOP FOR MUKDEN.—A large railway workshop will be opened this year at Shenyang (Mukden) which will be equipped with machines for the manufacture of railway supplies and the repairing of locomotives for the various Railways in the North-East. The plans have been prepared by the North-Eastern Communications Committee, with the approval of the Ministry of Railways. The initial expenses for the proposed factory are estimated at one million dollars, which will be appropriated from the revenue of the various Chinese Railways in Manchuria. The site chosen for the factory is next to the North-Eastern University.

THE NEW TSITSIHAR-KOSHAN LINE.—Both passenger and goods traffic on the Tsitsihar-Koshan Line has been opened as far north as Taianchen. It is 30 miles from Taianchen to Koshan, the terminus. The earthwork for the railway track is already finished, and work is being hurried with the intention to conclude it by next autumn.

With the total coolie immigrants from Shantung, etc., numbering 200,000-300,000 spreading themselves along the Tsitsihar-Koshan Line, each year, the bean production and trade will quickly increase, while Japanese sundries, too, are bound to find a larger market.

The plan to build an extension right through north to Heihe opposite Blagovestchensk will be a matter of the near future.

TO CONSTRUCT SHIUCHOW-PINGSHEK SECTION OF CANTON-HANKOW LINE.—Surveying of the Shiuchow-Pingshek section of the Canton-Hankow Railway has been completed and construction work will be immediately started. The Ministry of Railways has remitted to the Canton Hankow Railway Administration a sum of $400,000 as initial construction expenses and will continue to remit $200,000 monthly until the line is completed.

KIRIN-HAILUNG RAILWAY.—Construction of the Kirin-Hailunfu Railway, connecting Kirin, Provincial Capital of Kirin, and Hailunfu, in south-eastern Heilungkiang, has been completed. The new line is over 300 kilometers in length and is regarded as among the most important Chinese-owned railways in Manchuria. With the completion of the line, it is expected that development of the rich mineral resources in Manchuria will be greatly facilitated.

It is announced that the ceremony formally inaugurating the line will be held on June 1. —*Kuo Min.*

TSITSIHAR-HEIHO RAILWAY.—To facilitate the early completion of the projected Tsitsihar-Heiho Railway, the merchants of Aigun, Nunkianghsien and Nohohsien, three important cities lying between the two termini of the proposed line, have submitted a petition to the Heilungkiang Provincial Government recommending the issue of a loan to meet the necessary construction expenses, towards which the three cities concerned will undertake to subscribe to the extent of five million dollars ($5,000,000).

It is pointed out that the proposed railway line will not only contribute to the effective defence of the eastern Heilungkiang border but will also give an impetus to the development of the rich mineral resources in the railway zone. The proposal has been forwarded by the Provincial Government to the North-Eastern Political Affairs Committee for approval.

SHIPPING AND SHIPBUILDING

THE JAPANESE PASSENGER LINER *TATSUTA MARU*.—The second of three similar 17,000-ton motor passenger vessels has been completed by the Mitsubishi Zosen Kaisha for the Nippon Yusen Kaisha's service between the Far East and California. This vessel, the *Tatsuta Maru*, is 560-ft. long with a beam of 72-ft., the depth being 42-ft. 6-in. She carries about 8,000 tons of cargo on a draught of 28-ft. 6-in.

Quadruple-screw eight-cylinder Sulzer-type machinery constructed under license in Japan by the Mitsubishi Zosen Kaisha has been installed in this vessel. Each motor develops 3,875 b.h.p. at 120 r.p.m., and has cylinders 580 mm. bore with a piston stroke of 1,100 mm. The sea speed of the *Tatsuta Maru* is 19 knots, but according to telegraphic reports she made an average speed on trial of 20.3 knots, the maximum speed being almost 22 knots.

There is accommodation for 222 first-class, 96 second-class and 504 third-class passengers, the officers and crew numbering 330. For a full description of this class of vessel readers are referred to the December, 1929, issue of this journal.

THE FIRST B. AND W. DOUBLE-ACTING TWO-STROKE-ENGINED SHIP.—The *Amerika*, fitted with the first Burmeister and Wain double-acting two-stroke engine, was completed last month and sailed on her maiden voyage to the Far East. On her return she will be placed in the North Pacific service.

TWO SMALL JAPANESE MOTOR VESSELS.—Two 4,150-ton motor ships have been completed by the Mitsui Bussan Kaisha for the Dairen Kisen K.K. They are similar to the *Tensan Maru* and *Sensan Maru*, and are 325-ft. long with a beam of 46-ft. 5-in. and a depth of 21-ft. 5-in. B. and W.-type machinery constructed by the hull builders is installed, comprising a six-cylinder motor in each case. It develops 1,650 b.h.p. and has cylinders 550 mm. bore with a piston stroke of 1,100 mm. The names of the two new vessels are *Ronsan Maru* and *Konsan Maru* respectively.—*The Motor Ship.*

OSAKA SHOSEN KAISHA'S SHIPS.—The Osaka Shosen Kaisha will launch shortly its four semi cargo-boats which are now under construction. These four boats will be equipped with Diesel engines and will have a speed of 18 knots per hour. Their tonnage is more than 8,400 tons each.

One of the vessels will be completed shortly and will sail for Yokohama in the middle part of July to enter the Japan-New York service, for which the four boats are being constructed.

The first boat will be named as *Kinai Maru* the second will be called *Tokai Maru*, the third *Sanyo Maru*, and the fourth *Hokuriku Maru*.

PUBLIC WORKS

NEW YANGTSZEPOO DOCK.—Plans are now under way for construction of a new city wharf on land in the vicinity of Yangtszepoo Road and the river by the Shanghai Municipal Council.

The proposed project, involving an expenditure of approximately Tls. 1,873,380, will provide increased public landing facilities. The plans include the building of a new wharf the construction of connecting roads, and the installation of necessary machinery.

The plans authorized the purchase of 76.196 mow of land in that district. It is said that the wharf proper will cover 36.169 mow, the remainder being given over to the proposed roads. Should the remaining 50 mow be in excess of the requirements of such road construction, the surplus will be retained to ensure a considerable reduction in the net ultimate cost of the wharf. This is suggested in view of the rapidly increasing value of land in the Yangtszepoo district.

The wharf will be 679 feet in length, as compared with 200 feet in the case of the Wayside Wharf. It will be utilized primarily for the discharge from lighters of cargo from steamers and from the Pootung side of the river.

NEW RESERVOIR IN MANCHURIA.—The new plan is to construct a reservoir large enough to have a supply capacity of 30,000 tons a day in Tashaho district, 17 miles north of Dairen, at the outlay of Y.10,000,000.

At present, the Wangchiatien Reservoir can give 10,000 tons a day, and the Lungwangtang Reservoir, on the Dairen-Port Arthur coast road, may supply 12,000 tons a day.

As to the daily consumption, the average for 1929 was 22,463 tons. The balance can be made up with the supply by the initial minor installations.

Supposing that the new Wangchiatien Reservoir will be completed in 1934, the total daily capacity will be 34,500 tons, barely sufficient to meet the quickly increasing consumption.

The new Tashaho site has been selected by the Water Source Commission and others of Kwantung Government after a careful investigation.

The water is to be conducted to Dairen by means of iron pipes.

TELEPHONE, TELEGRAPH AND RADIO

The Ministry of Communications is stated to have accepted a proposal from the Ministry of Posts of the German Government to inaugurate as soon as possible a wireless telephone service between Germany and China.

The Communications Ministry will also arrange for radio communication between China and the various European countries through the German radio station at Nauen, near Berlin. The completion of the arrangements, it is believed, will greatly facilitate transmission of messages between the Far East and Europe.—*Kuo Min.*

TELEFUNKEN STATION IN NANKING.—A contract has been signed by the Central Government for the erection in Nanking of one of the most powerful radio broadcasting stations.

The radio station will be erected for the Government by the Telefunken Company of Berlin, represented by the Siemens China Co. It will be powerful enough to cover the whole area of the Chinese Republic as well as surrounding countries.

The transmitter plant will be erected near the Yangtze River and two 400-ft. self-supporting steel masts will be a conspicuous landmark of the capital in the near future. A power plant of 600 h.p. will render the broadcasting station independent of power supply from the city electricity works.

Y.40,000,000 PHONE IMPROVEMENT IN JAPAN.—Telephone communication between Tokyo, Okayama and waypoints will be made almost as easy as town calls by the completion in July of the construction work for the subterranean telephone trunk between the two cities, which has been going on during the past six years of a cost of approximately Y.40,000,000.

The trunk line has been installed throughout. What remains is the relay station at Himeji in which telephone engineers expect to overcome technical difficulties by the end of July at the latest. This will enable the Communications Office to open the trunk for service early in August.

One feature about this trunk is that by far, the greater part of it, which penetrates the rural districts, is carried by underground conduits which are laid parallel to the Tokaido and San-yo lines of the Government Railways, whereas in urban districts the trunk is carried overhead.

This is due to the fact that where linesmen can have easy access to the telephone wires in towns and cities, they would have considerable difficulty in adjusting or even locating anything that might go amiss with the rural lines, were they carried overhead. Since the rural lines are more susceptible to the elements than the urban lines, the Government has all the more reason for sinking them underground in the countryside.

Inasmuch as the increased distance means weakened sound, the Communications Office has established several amplifiers at way points, so that the communication between the two termini and way points can be heard with much clearness.

NEW WIRELESS STATIONS IN SZECHUAN. Two new radio stations, one at Chengtu and the other in Chungking (Szechuan), installed by the Ministry of Communications, have recently been completed and are now open to the public for the transmission of messages. To further facilitate intelligence service in Szechuan Province and also between Szechuan and the neighboring provinces, preparations are under way for the construction of radio stations in other important cities.

MINING

GOLD MINING.—The initial expenses for the opening and development of several gold mines in the country, in accordance with the program of the Ministry of Agriculture and Mining, have been estimated at $1,500,000.

Three Gold Mining Bureaux will be opened at an early date in the North-Eastern provinces for the purpose of prospecting the rich gold mine deposits in that part of the country. A detailed program, formulated by the Ministry of Agriculture and Mining, has been approved by the State Council. The Heiho Gold Mining Bureau will be established in Aigun, northern Heilungkiang. A similar bureau will be opened at Siwei also in Heilungkiang, while the third Bureau will be opened at Ilan, northern Kirin.

To facilitate the surveys, the outlying provinces will be divided into four main groups as follows:—

North-East: Shantung, Hopei, Jehol, Kiaoning, Kirin and Heilungkiang.

South-West: Hunan, Szechuan, Yunnan, Kweichow, Sikong and Tibet.

Mongolian District: Inner and Outer Mongolia.

North-West: Kansu, Kokonor, and Sinkiang.—*Kuo Min.*

AVIATION

AVIATION FIELDS.—The Aviation Department of the Ministry of War is planning to construct a number of aviation fields in various important centers in the country to provide landing places for the Government airplanes. Among the first of such fields to be opened will be those in Yingchowfu (Anhwei-Honan border), Chowkiakow (eastern Honan), Teining and Tsaochow (southern and south-western Shantung), Kweiteh (north-eastern Honan), and Lincheng and Ichowfu (south-eastern Honan).—*Kuo Min.*

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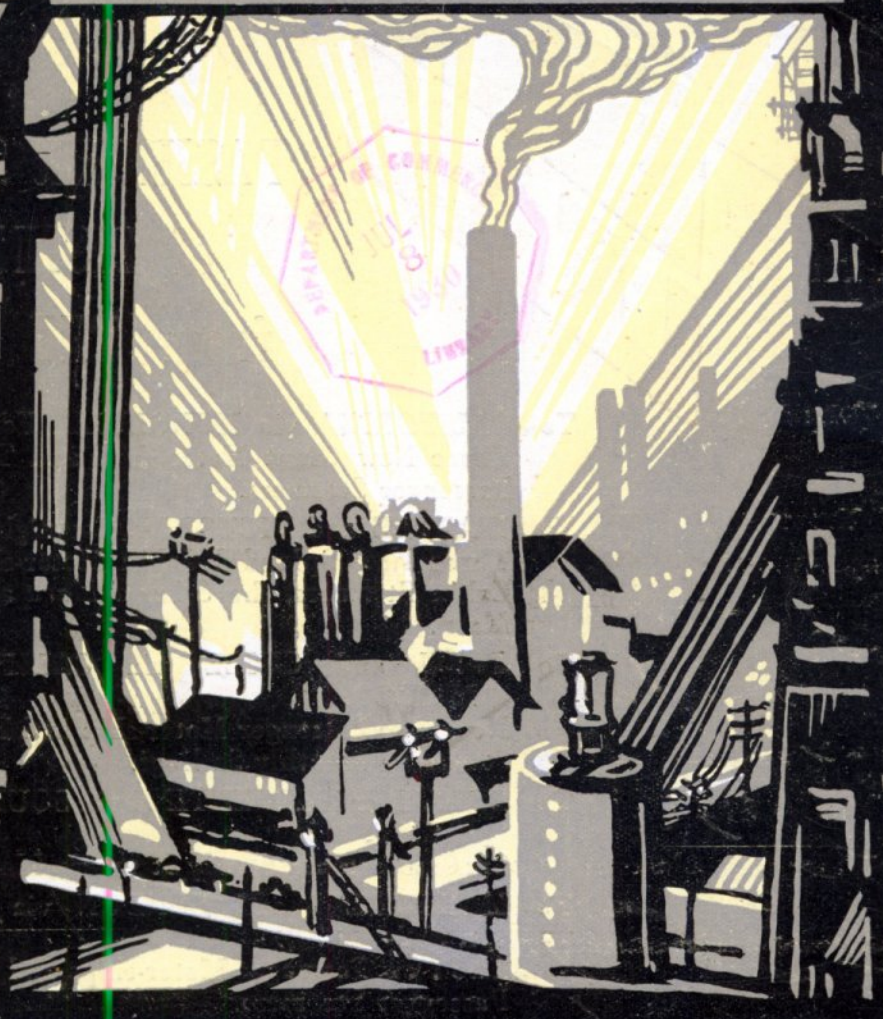

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We further propose, in accordance with our settled policy, to proceed to the discussion with the Chinese Government of other provisions to be incorporated in a new Commercial Treaty, besides those which relate to customs duties. It is sincerely hoped that through mutual appreciation by each nation of the just and reasonable position of the other, satisfactory progress will be assured for these negotiations.

It appears that recently, along with the re-appearance of signs of unrest on the political horizon of China, a section of the press in that country has been disseminating reports, suggesting that we had a hand in bringing about that turn of events and were engaged in the prosecution of unworthy designs. Such accusations are too preposterous to call for any denial. It cannot be necessary to reaffirm our known policy of fair and square dealing in China.

The annexe to the Sino-Japanese Tariff Treaty which has attracted considerable attention and criticism in China is that dealing with the undertaking of the National Government to repay outstanding defaulted obligations. This question looms particularly large as China is faced with the necessity of going into the markets of the world first to revive and then to develop a national credit. China's national credit is at this moment lower than it has ever been in the history of the country. It is not only not possible for the Government to borrow in the international money markets, but merchant credits are frozen and industrial credits reflect the general unwillingness to make advances to firms whose credit, in international markets, cannot be better than the credit of the country of which they are a part. The result is that the national Government is unable to obtain funds for reconstruction and currency reform and railway building, while private organizations are unable to find capital for the creation and fruition of a national industry.

The total indebtedness of China, to Chinese and foreign creditors, is about $3,000,000,000 Chinese currency, of which about one half is in default. A method must be found to liquidate this huge indebtedness, so that new credits may be evolved. But even more important, at the present stage of developments, is the necessity of assuring the world that it is the intention of China to meet these obligations when she can pay and that a sincere effort will be put forth to find a method of meeting these obligations. Mr. T. V. Soong stressed this necessity in the annual report of the Ministry of Finance. The fact that Japan is one of China's principal creditors makes it altogether fitting that this intention of the National Government should be included in a treaty between China and Japan.

The amount of the defaulted indebtedness is indubitably subject to readjustment. Some of the obligations and particularly some of the interest factors are hardly able to stand the test of public scrutiny. It is, however, not possible for a debtor alone to determine which of the obligations he will recognize; this can only be accomplished advantageously to the national credit by the mutual endeavors of the creditors and the debtors and the proposed conference for the readjustment of debts will undoubtedly serve as the means for reducing China's defaulted indebtedness and at the same time of restoring China's credit. When the Legislative Yuan recently passed a resolution stating which kinds of debts were not to be recognized, it committed a tactical blunder, for it raised a doubt in the minds of creditors of the *bona fides* of the Government's intentions. It is to be assumed, however, that such was not the intention of the Legislative Yuan. Rather was theirs a gesture of caution based upon legalistic and constitutional grounds that Executive officials should not in the future enter upon engagements without consulting them somewhat in advance, lest they be forced to make serious changes when the public document comes before them for scrutiny previous to ratifications. In accordance with the system of Government prevailing in China at the present time, the Legislative Yuan is quite within its rights and the slight flurry occasioned by the strictures over the Sino-Japanese Tariff Treaty need not be regarded as a recrudescence of Anti-Japonism nor even a criticism of the Minister of Foreign Affairs of China but a mere assertion of a right which is established in law but not yet altogether in practice.

The final ratification of the Sino-Japanese Tariff Treaty by both Japan and China marks the end of anti-Japanese agitations in China. It is the beginning of a new era of friendly intercourse. This novel condition does not arise from the mere treaty but rather from the spirit evident during the negotiations and the desire on the part of the best elements of both people that a way to peace and friendship should be found. The Treaty becomes a symbol of that desire and that accomplishment. It will be followed by other manifestations of good-will on both sides. It will be followed in particular by the cultural co-operations between the two countries through the expenditure of the Japanese share of the Boxer Indemnity for cultural research in China. It will find its happiest expression in the renewed and increased trade between the two countries, so that Japan can partake of the benefits of a stabilized China, which Japanese sacrifices in possible immediate gains for uncertain future considerations, will assure.

The British Boxer Indemnity and the Railways of China

THE decision of the British Government to allocate two-thirds of the British Boxer Indemnity for railway purposes in China has aroused considerable pleasure among the Chinese, who feel that this is a constructive use of the money. It is true that many Chinese sought these funds for numerous educational, charitable and what might aptly be termed miscellaneous projects, but the Ministry of Railways insisted upon its constructive program and its desires in the matter were respected by the British Government. The measure is not only wise for China but wise for Great Britain. China will probably be able to complete the Canton-Hankow Railway, Britain will be able to sell to the Ministry of Railways additional steel rails, locomotives, cars and other railway supplies. To British trade in China, the allocation of these funds for railway purposes, means a tremendous relief from the general trade stagnation which is the result of political conditions which have heretofore impeded the development of Mr. Sun Fo's railway development program and the advice of Mr. Poland and Mr. Mantell that the existing railways be thoroughly rehabilitated. Mr. Sun Fo's program would find China with additional mileage, her railways in an efficient, modern working condition and business booming because of the additional trade from the purchase of railway materials. Only the civil war has prevented this program from being completely realized and the first relief in an otherwise gloomy picture is the announcement of the availability of the British share of the Boxer Indemnity for railway purposes.

As far back as February, 1924, *The Far Eastern Review* advocated the use of the Boxer Indemnity for railway purposes. At a time when it was everywhere advocated that Boxer Indemnity funds should be spent exclusively for exceedingly uncertain cultural purposes, *The Far Eastern Review* was practically alone in raising the question of the use of these funds for railway purposes. In July, 1924, Mr. George Bronson Rea, its editor, advocated the use of the unpaid American portion of the Indemnity for the building of the Szechuan railway. That may not altogether have been practicable, but the essential idea that the physical basis of the Chinese people must be changed before there can be stability and genuine progress in the country and that that physical basis is dependent upon the modernization of the means of communications, has generally been accepted by the best thinkers in China. A country the size of China with only 7,000 miles of railways cannot hope to find peace or stability; no army can move about with sufficient rapidity to put down banditry and insurrection; the peasants cannot get their produce to ports with sufficient rapidity to be real factors in the markets of the world; manufactured goods move from seaboard ports to interior cities so slowly and at such a terrific cost that the people cannot afford to purchase them. The backwardness of China does not involve any inherent inability of the Chinese people. It is due to a lack of modern means of communications. This has been the central idea of the policy of *The Far Eastern Review* for a quarter of a century——we continue to

advocate the same policy—build railways and more railways until China possesses just such a network as Dr. Sun Yat-sen's map of his projected railways indicated. Then there will be no backwardness in China.

In the October, 1924 issue of *The Far Eastern Review*, a survey was made of the three points of view on this subject: the American, the British and the Chinese. It was with pleasure that we noted at that time that British opinion was beginning to favor the utilization of Boxer Indemnity funds for railway purposes. It was perfectly evident that as the British traders sought to restore British markets after the War, there could be no better introductory method that the employment of Boxer Indemnity Money for railway purposes in China. It was then advocated that the interests on the funds invested in railways should be used for educational purposes, thus accomplishing two tasks by the means of one fund which would be permanently invested in a sound security while educational institutions would, in effect, be endowed by their ownership of railway bonds.

This plan fell through largely because of the turmoil which began in the year 1924 and continued for several years thereafter. It will be remembered that the British Government sent a Commission to China, headed by Lord Willingdon, now Governor-General of Canada, to study the problem of the return to China of the remaining British portion of the Boxer Indemnity. On this Commission were three Chinese, Dr. Hu Shih who has long advocated changing the physical basis of the life of the Chinese people, Dr. C. C. Wang, who had been Managing-Director of the Chinese Eastern Railway and is one of the foremost railway engineers in China, and Dr. V. K. Ting, the greatest geologist and scientific thinker in the country. This Commission reported as follows:

"The delegation unanimously recommend that the most profitable form of work of outstanding national importance, and an enterprise which could be counted upon to confer a real benefit on large numbers of Chinese people, would be the extension of railways."

The Commission finally recommended the linking up of the trunk-line of the Hankow-Canton Railway as "the most suitable and the most useful project which could be adopted."

It is with much gratification that *The Far Eastern Review* points to its own part in the genesis of this idea, not so much as a matter of self-glorification but because at the time, opinion was so generally concentrated upon cultural work that little thought was given to the possibility of employing these funds on a railway, except in this engineering paper in which there would naturally be a keener interest in the engineering phases of any project. The future of China depends upon the building of railways—peace and prosperity can only come with adequate means of communications. This is the corner-stone of our political policy as regards China.

The National Construction Commission

PARTICULAR interest will be shown by engineers in the work of the National Construction Commission, the chairman of which is Mr. Chang Ching-kiang, a prominent Nationalist leader who is concurrently Chairman of the Provincial Government of Chekiang province. This Commission undertakes engineering activities on behalf of the National Government, its objects being enumerated as follows:

1. To study and plan constructive works throughout the country as enumerated in Dr. Sun's Plans for National Reconstruction.
2. To undertake works pertaining to water conservancy, electrical power developments and other governmental enterprises not belonging to the various ministries of the Government.
3. To direct and supervise private-owned electrical enterprises.
4. To undertake, with the consent of the ministries concerned such governmental enterprises as may come under their jurisdiction but have not been started by them.
5. To direct and supervise the works undertaken by the provincial Departments of Construction.

Much has already been accomplished by the Commission, particularly in the field of engineering. The most notable achievement was the development of a radio network, centering about the agreement with the Radio Corporation of the Philippines, a subsidiary of the Radio Corporation of America. The radio bureau of the Commission was organized in July, 1928, and within a period of six months was in control of 30 radio stations scattered throughout China. Many of these stations had been in existence for some years either as military or provincial stations, but to the Commission must go the credit for co-ordinating them into an efficient, working organization which is of service to the whole country and which is capable of permanent extensions. In accordance with the plans of the Government, this radio network has been turned over to the Ministry of Communications for operation now that it is organized. The National Construction Commission is in effect a planning and initiating body, which turns over to various Ministries agencies which rightly belong to them once the agencies are adequately organized.

In the field of electrification, the work of the Commission is most interesting. According to its figures, there are 575 electric light and power plants in China aggregating 527,240 KW. Of these companies, 17 are Government-owned, the remainder being owned by private capital. The Commission has the right to supervise the privately-owned plants which must register with it. Among the principal plants now being operated by the Commission are the Nanking Electric Works, the Tsishuyon plant between Wusih and Changchow and the Hangchow Electric Plant. The Nanking plant was a Government concern from its inception, although it has been very heavily mortgaged to American suppliers of electrical machinery; the other plants were privately-owned but have been taken over by the Commission on terms determined upon by the Commission.

There can be no question but that the Commission will serve a useful purpose in establishing and developing electricity plants throughout the country. There can also be no question but that the Commission will serve a most useful purpose in the supervision of privately-owned plants. There is, however, a danger in the Commission's tendency to force Government ownership even when private ownership has already been established. There is a danger that such a proposition involves elements of confiscation and that because of the uncertainty that comes to capital from such a tendency, capital, particularly foreign capital, will decline to permit itself to be employed in the electrical development of China. It is a remarkable fact that whereas at the present time, the coffers of the banks of Shanghai are so full of silver that they have produced a veritable glut of the white metal on the market, none of this cheap money is being used for the electrical development of China. If the Commission had not adopted so stringent a policy with regard to Government ownership, it may be assumed that large amounts of Chinese privately-owned capital would have been made available for the electrical industry. There are also reports in various places, that the Commission, in taking over old obligations, assumes that it alone may determine the terms of settlement and that the creditor must either accept these terms or leave them. This is an undoubted error from the standpoint of future credits and future developments.

We are not calling attention to these facts in a spirit of carping criticism. As an engineering journal, we are most enthusiastic over the work of the Commission and will do everything within our power to assist it and to help it to success. This is a fundamental work in the reconstruction of China, for without the modernization of the means of generating light and power, how can any phase of the life of the people be modernized. It is to be assumed that whatever controversies arose between the Commission and the owners of private capital in electrical enterprises, were due to the difficulties of the present situation in China and that in the future the Commission will adopt a policy which will permit the employment of private capital both Chinese and foreign. It will be quite impossible for any Government in China to finance the whole cost of electrical developments in China during the next decade. It would be impossible for any Government, because of the huge capital outlays required. It would be to the advantage of China to encourage privately owned enterprises on condition that they are adequately supervised.

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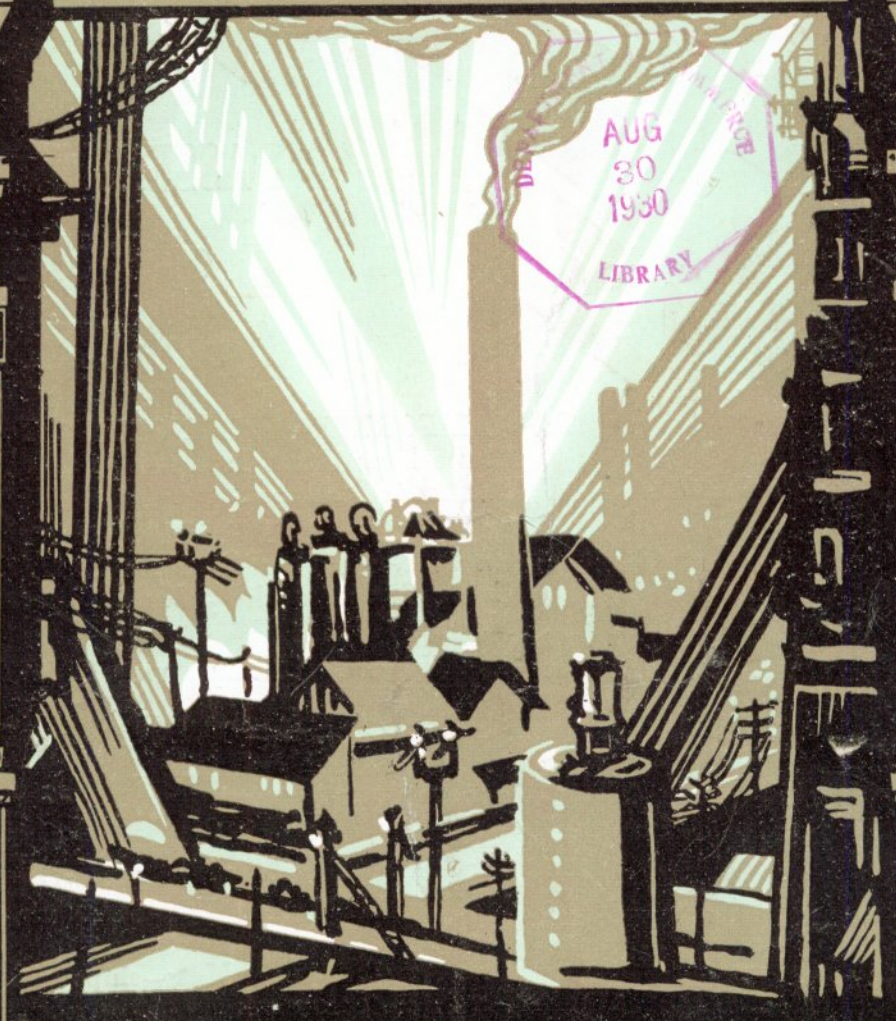

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Poor Shensi!

While Millions of Human Beings are Dying of Starvation in the Cradle of the Chinese Race, a "Christian" Hero and a "Model" Governor Block the way to Succor!

THE article on "The Satochow Irrigation Project" written by Mr. John Davis, an American engineer working under Major O. J. Todd in the construction of the project, brings up to date a similar article published in the November 1929 Number of the *Journal of the Association of Chinese and American Engineers*. Mr. Davis enlightens us by first hand testimony, why the American Red Cross could not ask the American people to contribute a great relief fund to succor the starving millions of Northwest China. In Saratsi, after agreeing to provide protection to the C.I.F.R.C. engineers and workers, the Provincial Government failed miserably to live up to its contract. The Commission has been forced to engage its own guards for protection against the bandit gangs who terrorize the countryside. The staff sleep with rifles and revolvers prepared to defend their lives against surprise night attacks and during the day carry forward their work under the vigilance of guards posted on the roofs of the buildings to watch for the approach of bandits.

If this is the situation in the Province of Suiyuan, served by a railway from Peking and under the direct rule of Marshal Yen Shih-shan, the "Model Governor," what must be the conditions in Shensi, far beyond the railhead of the Lung-Hai or Peking-Suiyuan lines. If a small group of relief workers are not safe from the attacks of bandits in Suiyuan, what would befall the hundreds of American Red Cross workers engaged in carrying relief to the starving people of Shensi? The complete breakdown of law and order in China and the inability of its rulers to discharge their most rudimentary functions, is responsible for the failure of the American Red Cross to undertake a task that can be carried to a successful termination only with a bowl of rice in one hand and a gun in the other. The experience of the C.I.F.R.C. in Suiyuan is sufficient proof that the Chinese authorities cannot or will not provide this protection and that the grain contributed by the American people to save the starving would feed the soldiers or bandits responsible for the catastrophe. The American Government cannot ask its official relief organization to risk the lives of its staff and workers in a country whose government is not only powerless to protect them, but too proud to admit the truth; even to save the lives of its people. Two millions of peaceful Chinese have died in the past two years in order to satisfy the ambition of a Christian War-Lord, the Hero of the Missionaries! Another million will perish miserably this winter because this "Paladin of Righteousness" and his Political Ally, the "Model Governor" of Shansi, hold the railways, the highways, byeways and other means of communications with the famine stricken regions. These railways, with their rolling stock, motor buses, automobiles and other transportation urgently needed to rush aid to these starving people cannot be released for humanitarian purposes. The fate of Feng and Yen depend upon their ability to hold these sources of revenue and avenues of retreat. As far as Feng is concerned, Shensi has been sucked dry. It has no further value to an army that must find fresh territory to live upon. The province of Shensi has served its purpose and its people that are left alive must be sacrificed to the needs of the War-Lord and his hosts. Here is one of the main causes underlying the present war. Kansu is starving. Two years or more supporting Feng's armies, completed the utter ruination of this province. Three years of Feng's rule in Shensi has transformed this once fairly prosperous province into a vast graveyard. Feng's armies cannot retreat into the devastated Northwest; they must fight to break out of this corner, or starve with the people they have ravaged and ruined. This explains the present civil war, and if Feng wins, in another two years, Shantung, Honan and North Hunan will be despoiled, impoverished and their people brought to the verge of starvation.

Nanking may be as corrupt and inefficient as the propagandists of the Feng-Yen combination make it out to be; but it cannot fairly be held responsible for conditions that have condemned millions of defenseless peasants in the Northwest to a lingering death and sold their young women into lives of hopeless bondage and degradation. Nanking may have raised enormous loans since Chiang Kai-shek assumed command of the Nationalist armies, but if the disbursement of these funds is ever audited, it will be revealed that a fair proportion of the proceeds went to buy the allegiance of a brace of War-Lords whose other sources of revenues had been destroyed by their own rapaciousness.

We hold no brief for Nanking, but with all its shortcomings, it comes nearer to being a government worthy of respect than any other régime that has exercised power in China for the past fifteen years. It deserves support from all disinterested foreigners in order that a strong centralized government may be evolved out of the present chaos and save China from a prolongation of the horrors that have brought the country to ruin and its people to misery, degradation and death. Foreigners have their points of difference with Nanking, but in our opinion, the welfare of the millions upon millions of despairing human beings in China is of more importance than the immediate solution of the knotty problems involved in China's international relations. Nanking in due course, will deprive the foreigner of his few remaining extra-territorial privileges. That, however, is an affair that the governments concerned are quite competent to properly handle.

The propagandists of the Feng-Yen combination accuse the Nationalist leaders of being crooks, grafters, robbers and worse. The foreigner has no means of ascertaining the truth of these statements and even if they could be proved, it would leave us cold. The Northern Militarists had their chance to give China a strong efficient government and bring prosperity and security to the country. But they sold the birth rights of the people for a pittance; they floated and pocketed one foreign loan after another; they hypothecated every available asset of the nation; they issued unauthorized bonds secured on the Customs; they ordered millions of dollars of railway and other equipment and refused to pay for it; they imposed new taxes; flouted their treaty and loan obligations and squeezed, pressed, milked and sucked the people dry, to pay for their interminable wars over a division of the spoils. Their defeated leaders with their wives and concubines are enjoying their stolen millions in the safe precincts of Dairen, Beppu, and other places outside the reach of Nationalist retribution. Now that Feng and Yen—the last of the Peiyang Generals—have started another war, these harpies and vultures are preparing to return and sink their talons and beaks once more into the flesh of their helpless victims. The Nationalists may be as bad as they are painted by the North, but nothing they may do can begin to compare with the orgy of misrule and tyranny, wholesale peculation of public funds and supreme indifference to the rights of the people that characterized the rule of the Northern Militarists.

The Pot calls the Kettle black. The air is thick with the revilings of both sides, but behind all the thundering and vituperation of the North, stands the grim Shadow of Death; of millions of despairing human beings praying for deliverance from the fate that the grasping War-Lords of Shansi and Shensi have brought upon them. And these unfortunates are doomed to die because this combination of a "*Christina Hero*" and a "*Model Executive*" (God Save the mark!) dare not surrender the railways and motor trucks to carry food to their starving compatriots. The revenues that might be used to save the lives of the people whose labor and necessities make their collection possible, must be diverted to the maintenance of huge and useless armies and the prosecution of a senseless war that no matter which side wins, must bring added horrors and impose heavier burdens upon the broken backs of a people quivering under the lash of pitiless taskmasters.

It is impossible for any right minded observer to view the situation in China with feelings other than of deep sorrow and resentment against a system that dooms millions of people to death by starvation, typhus and disease. American charity would long ago have contributed the grain to relieve these farmers of Shensi if the necessary guarantees were forthcoming that the food would be permitted to reach the real sufferers. No such guarantee could

be given and the civil war now raging in the Yellow River regions makes still more difficult the passage of relief trains. No outside help can now reach Shensi.

Perhaps it is the duty of the American people through their official Red Cross organization to insist upon sending relief into Shensi, handing over the grain to the Northern Chinese authorities for distribution. Congress might have voted a great wheat fund of $25,000,000 to help our own farmers by buying up their surplus wheat in order to succor the starving in Shensi, but there were no guarantees that the wheat so dispatched to China would reach its destination. On the contrary there was every certainty that it would be seized to feed the armies and bandits of North China whose exactions, depredations and wholesale confiscation of food-stuffs is responsible not only for the famine but for the civil war forced upon Nanking by the armies of Feng seeking new feeding and foraging grounds and a more prosperous people to prey upon.

It is no concern of the foreigner what China does in her own house. No nation can intervene, even in the Name of Humanity, to save the people of any province from starvation and death, unless invited to do so. Foreigners can only look on and wonder that such things can be and, as far as possible, refrain from comment. But when the Chief Publicity Agent and spokesman of the Yen-Feng combination arraigns Americans as being responsible for the failure of the Red Cross to succor the starving millions of Shensi, it is high time that the truth concerning the causes leading up to this situation be as bluntly and forcibly stated.

Nanking cannot be held responsible for the conditions in a territory held as the preserve of its bitterest enemy, yet it continues to draw plans for the construction of huge highway and railway schemes, harbor and river improvements, city planning, public works and other undertakings calling for the expenditure of hundreds of millions of dollars, while foreigners interested solely in the material development of the country hail these gestures as signs of progress. But we are old-fashioned enough to hold that the first and highest duty of Nanking, of Peking, of Kaifengfu, of Canton, of Mukden, and other centers of Chinese authority, is to the people of Shensi, the oldest of the Eighteen Provinces, the birthplace of the Chinese nation. A truce based on the urgent necessity of rushing relief into the stricken province would do more to elevate China in the esteem of the world and assure outside sympathy and contributions than all the propaganda claptrap now disseminated by the official press champions of the contending factions.

Ten years ago, when the Japanese held the Province of Shantung, the Chinese wail of anguish over this desecration of the Holy Land of China, stirred the sympathy of the world. In the last ten years, the people of Shantung have emigrated *en masse* to Manchuria in order to escape the crushing tyranny of the militarist task-masters who took over the province when the Japanese withdrew. To-day, thousands of the people of Shensi, the cradle of the Chinese race, are dying daily of starvation, and aside from an occasional missionary appeal that falls on deaf ears or the campaign of an unofficial relief organization trying to raise funds in the United States for their succor, not a voice is raised in their behalf.

Poor Shensi! It's people are forgotten; their cries for help drowned in the roar of crashing armies and the propaganda thunderings of rival war-lords.

G. B. R.

The Satochou Irrigation Project

By JOHN DAVIES

THERE had been drought for two years in Suiyuan. Drought, of course, meant famine. And famine meant typhus, the dreaded famine fever. Driven desperate by the plight in which they found themselves, the people appealed to the provincial government to remedy the situation by means of irrigation. The provincial government invited Major O. J. Todd, chief engineer of the China International Famine Relief Commission, to make a preliminary survey of the district in order to determine the feasability of an irrigation system. Responding promptly, Major Todd went into Suiyuan in the spring of 1929, made his survey and reported that the territory could quite easily be irrigated. On June 1, 1929, a contract was signed whereby the China International Famine Relief Commission was to take complete charge of the construction and advance a loan of $350,000, which was to be repaid in water rates when the irrigation system was in operation, while the provincial government was to supply $200,000, arrange for right of ways and provide protection to the C.I.F.R.C. engineers and workers. Before the end of the month, Major Todd had arrived on the scene and taken over the work which had been started by the government. This, then, was the genesis of the Satochou Irrigation Project.

The area to be irrigated by the Project is approximately two million mow. It lies in Saratsishien, just south of the Peiping-Suiyuan railway line. The water for the system is taken from the Yellow River about a mile south of the hamlet of Tenkou, twenty miles from Paotou, the terminus of the Peiping-Suiyuan Railway. Running east from the intake, the main canal extends nearly 43 miles to the dried bed of the Black River. At right angles to the main canal are fourteen subsidiary canals, the laterals. The fourteenth lateral makes use of the Black River course, but cuts across the old meanders. All of the laterals lead from the main canal to the Yellow River, which, by flowing in a south-easterly direction, forms an acute angle with the main canal. The Satochou Project is a huge right triangle with the main canal and the fourteenth lateral as the two sides and the yellow River as the hypotenuse.

The river work is practically completed. Three massive gates have been installed at the intake. Embankments have been built, for the country through which the Yellow River flows is flat, even here at the foot of the Mongolian plateau. And the river is capricious enough to change its course without warning. In digging the canals, several miles from the present course of the river, cross-bedded sand has been found indicating that recently the river had followed a quite different course from its present one. Hence the need for embankments at strategic points. A submerged wier is being laid about 200 yards downstream from the intake. Major Todd estimates that this wier will raise the water level in the main canal two feet. This will insure an adequate supply of water in the canals. To build this wier, two towers have been constructed, one on either bank of the Yellow River. Between these towers a cable is strung, attached to which are the stone barges used in the building of the wier. The rock for both the embankments and the wier is brought the two and a half miles from the Commission's quarry by a baby railway laid down by the C.I.F.R.C. engineers in 1929.

Work on the canals is not as far advanced as that at the headworks. With the control gates installed at the intake, water may be let into the main canal, barges brought in from the Yellow River and construction of the laterals appreciably speeded up. Major Todd estimates that the main canal and the first eight or ten laterals should be completed by October of this year. From the laterals water will be pumped up to the farms by means of ladder or dragon pumps, familiar sights in the Yangtze Valley and south China countryside. These treadle pumps are an innovation in Suiyuan,

The Headworks at the Intake

New Coal Pier for South Manchuria Railway Company*

By CHARLES BISHOP KINNEY

On July 1 the new coal pier for the South Manchuria Railway Company, located at Kanchingtsu, a village across the bay from Dairen, was completed and ready for operation. Final tests of the various machinery have been given; the dredgers have left; and the markings for buoys have being carried out. The first coal ship is expected to dock at the new pier in the middle of the month.

It is claimed that the new coal pier, while not the largest, is one of the most modern in the world, as the latest designed machinery furnished by Alliance Machine Company, of Alliance, Ohio is used. This statement was made recently by Mr. J. N. Alter, an American engineer who superintended the erection of the coal dumpers and coal conveyors.

Four years ago, Kanchingtsu was only a small Chinese fishing village, hardly known by Dairen residents, even though it is only five miles away by direct water route, and people seldom, if ever, mentioned the place. To-day it is a small, modern town, Westernized in every detail, and populated by Orientals. Plans are now being formulated to enlarge the town; it is reported that a primary school will soon be established. A new dirt motor road has just been completed which circles the bay of Dairen and connects Kanchingtsu with the city, a distance of 15 kilometers. Ferries ply back and forth at fifteen minute intervals, covering the five mile course in twenty minutes.

There is no passenger train service to Kanchingtsu, and there is really no call for it. Coal trains coming from Fushun will branch off at Nan Kwang-lin (a station on the main line, not far from Dairen) and travel a distance of approximately 12 kilometers to Kanchingtsu. This branch line is single tracked.

Construction of the new coal pier was started on July 9, 1926. The total cost of land rights, materials, machinery, railways, labor, etc. amounted to Yen 11,133,000. The officials in charge of operations figure that approximately 3,800,000 tons of coal will be exported from Kanchingtsu annually. Most of this will go to Japan, China and the East Indies.

The coal pier is protected by a long, well constructed breakwater, 973.68 meters in length. Five buoys and one light-house will enable ships to find the deepest channel leading to the pier.

The pier is 300 meters in length and 34 meters in width, built mostly of cement, thus ensuring not only strength but durability. Four ships, each of 8,000 tons capacity, can be accommodated at one time, the depth of water at low tide being 30 feet. The difference in tide at the coal pier is from seven to nine feet.

The writer spent half a day at the coal pier, examining the machinery and the rest of the plant, with two American engineers, who kindly undertook to explain the details, from beginning to end, of the new pier.

The coal, mostly bituminous, comes from the Fushun coal mines, which are operated by the South Manchuria Railway Company. Now that coal pier is ready for operations, all the coal heretofore carried to Dairen for export purposes will be brought to Kanchingtsu. A large coal yard, already completed, is located about three-quarters of a mile from the pier, and can hold approximately 3,000,000 tons of coal. Two large, up-to-date cranes have been installed there for the purpose of quickly re-loading coal cars when necessary.

Cars loaded with coal are placed at the beginning of the pier and the couplings are disconnected. The car of coal is then hauled by a wire cable or electrical mule, attached to a barney or hauling car up a 15 per cent. incline to the first rotary dumper. Here the coal car is turned over and the contents slide into a special car which, after it has been filled, is immediately carried to the second rotary dumper. These special coal cars are carried to the second dumper by electric engines. The coal is then discharged into a receiving hopper, where a belt with bins carries the coal over a boom conveyor. The boom conveyor extends from the hopper over the sides of the vessel, and 900 tons of coal can be placed into a ship per hour from each conveyor. Three new coal conveyors have been installed, thus making it possible to ship 2,700 tons of coal per hour from Kanchingtsu.

All the machinery is run by electricity, eliminating extra man power, unnecessary noise and danger. The entire transfer of coal from railway cars to dumpers and to conveyors is designed to eliminate abrupt falling of the coal and thus breakage is avoided. The new coal pier, experts claim, is the most modern type in the world and the largest in the Far East.

(Four Illustrations see next page).

*Detailed Description and Plan appeared in the February, 1929, issue of *The Far Eastern Review*.

N.Y.K to Scrap Old Passenger Ships

It is reported that the Nippon Yusen Kaisha, which has recently constructed a number of motor-vessels of the most up-to-date type, has decided to weed out its superannuated vessels, seven in number, all passenger-ships, ranging from 6,000 to 13,000 tons with the aggregated tonnage of 48,831.

The vessel that heads the list is the S.S. *Tenyo Maru*, 13,500 tons, which has long been placed on the Orient-American line and which saw her last service last month and is now moored at Kobe. It is understood that an offer was at first made by a breaking-up firm for the purchase of this vessel at the price of Yen 360,000, but that on the 14th of the present month arrangements were entered into between the Nippon Yusen Kaisha and a certain American shipping interest at Los Angeles for the sale of the *Tenyo Maru* at the price of about Y.400,000.

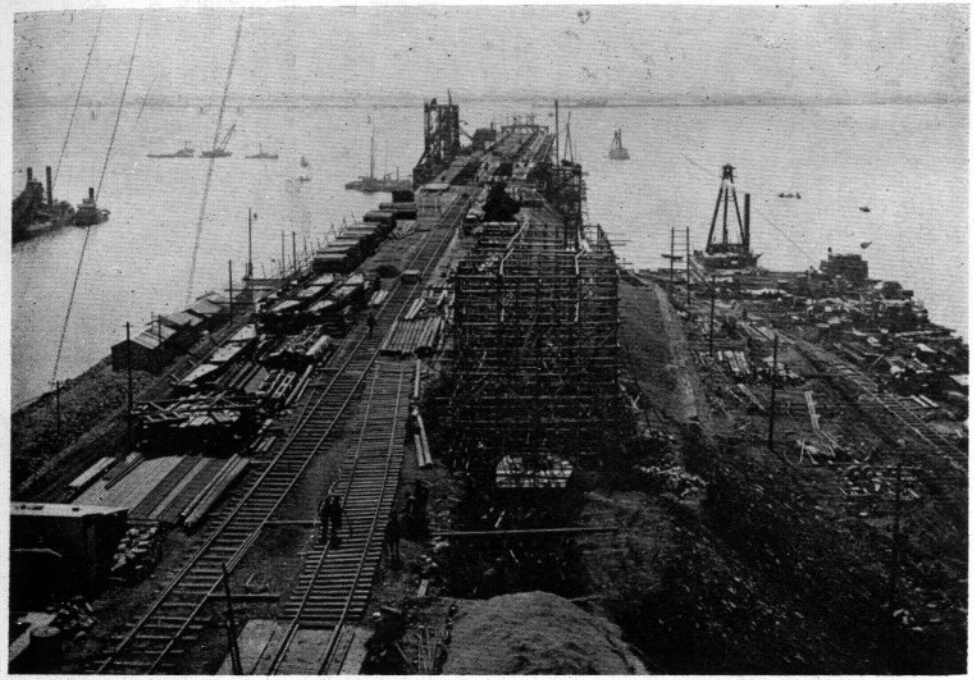
It is also reported that two steamers, *Awa Maru* (6,028 tons) and *Sado Maru* (5,898 tons), which have been on the run between Japan and Seattle and which have taken pride in the quality of the materials used for the construction of their hulls, have been sold to the Osaka Kaiji, whose business is to dismember steamers, at the price of Y.141,000 and Y.135,000, respectively. It is said that work for the dismemberment of these two vessels will be commenced before long.

In addition to the vessels above-mentioned, arrangements are being made, it is understood, for the sale of four other ships of the Nippon Yusen Kaisha, namely, *Kaga Maru* (5,860 tons) on the Australian line, *Tamba Maru* (5,846 tons) on the Bombay line, *Kamakura Maru* (5,846 tons) on the line along the eastern coast of South America, and *Kanagawa Maru* (5,853 tons) on the same line as last mentioned.

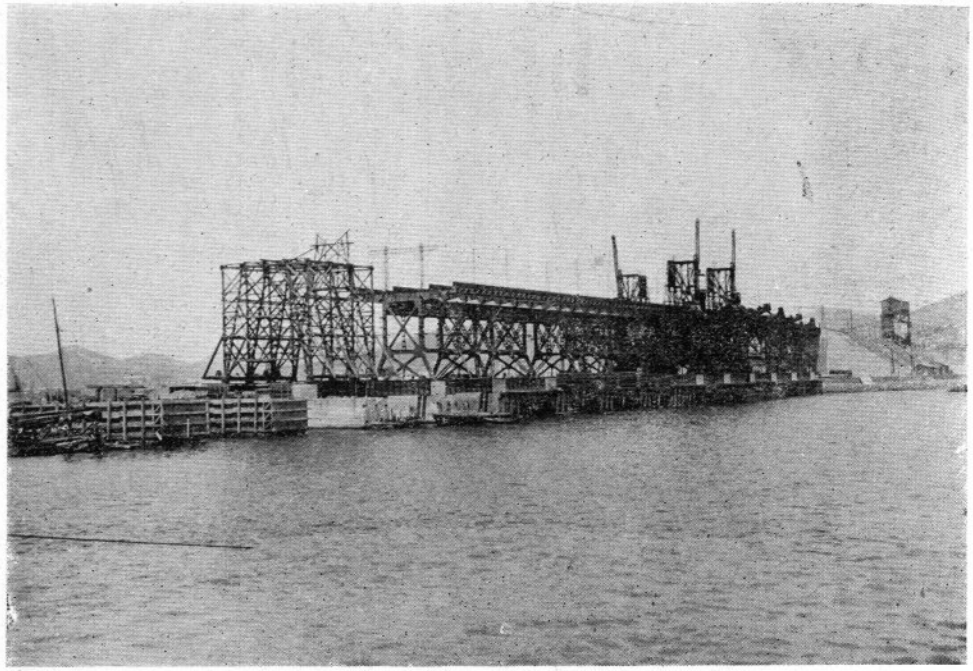
With this sweeping readjustment of the Nippon Yusen Kaisha as a start, it is rumored, other shipping companies in Japan will shortly follow suit, either mooring or dismembering their superannuated vessels so that they may be able to tide over the existing shipping depression.

NEW COAL PIER FOR SOUTH MANCHURIA RAILWAY AT KANCHINGTSU

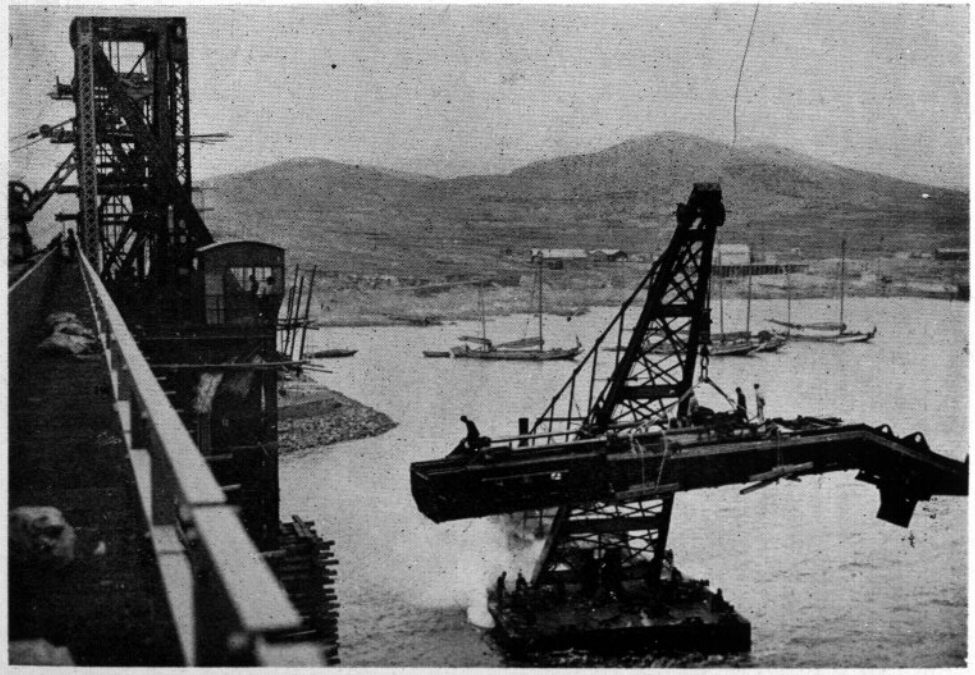
Equipped with Coal Dumpers and Conveyors Supplied and Erected by the Alliance Machine Company of Alliance, Ohio



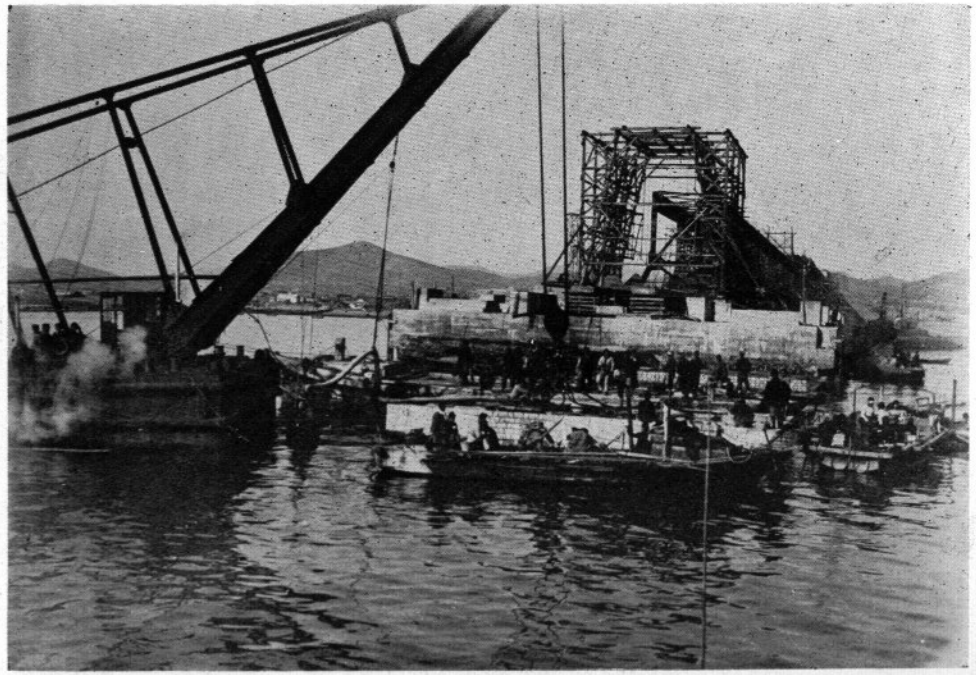
The Coal Pier Under Construction. The Port of Dairen in the Background



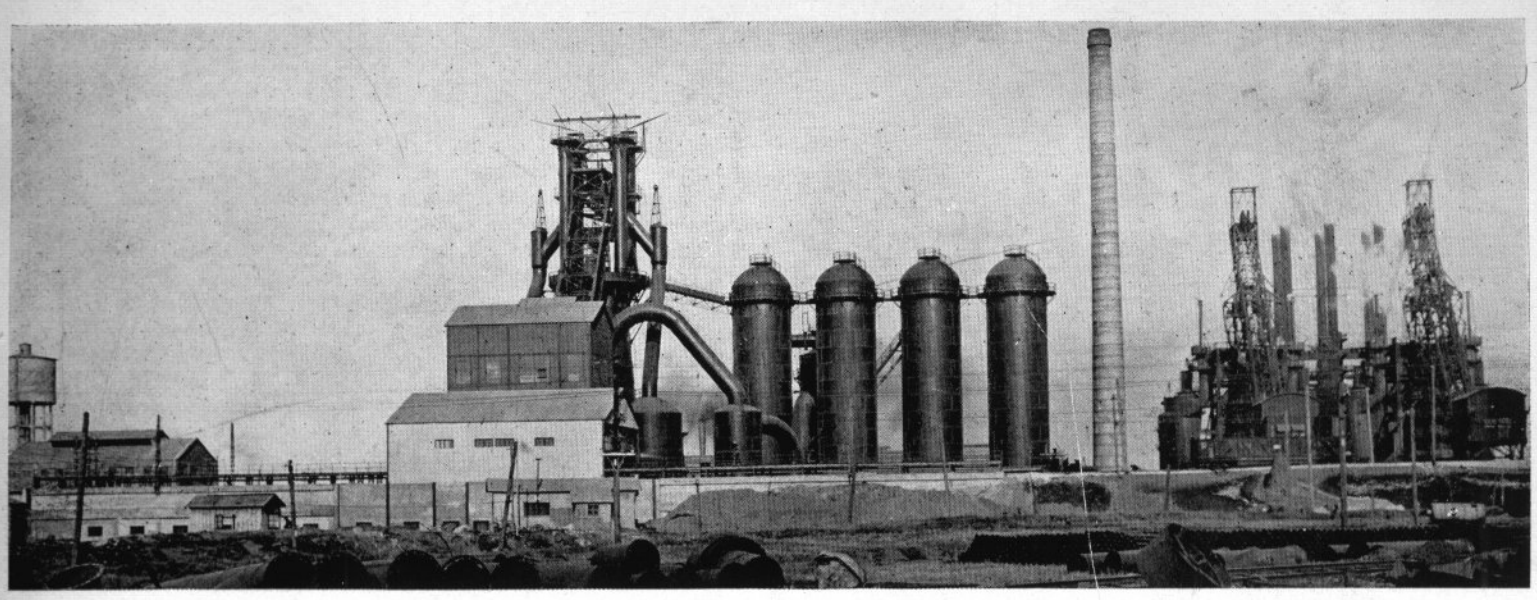
Another Section of the New Coal Pier at Kanchingtsu



Boom Conveyor About to be Connected with the Receiving Hopper. The Boom Conveyor Extends from the Hopper Over the Side of a Vessel, and 900 Tons of Coal can be Placed into a Ship per Hour from each Conveyor



Laying the Foundation of the Extension of the New Coal Pier, Cement and Steel are Mainly Used



General View of the Blast Furnace Plant, Anzan Steel Works: No. 1 Blast Furnace, Daily Production, 300 Tons; No. 2 Blast Furnace, Daily Production 300 Tons; No. 3 Blast Furnace, Daily Production 500 Tons

New 500-ton Anshan Blast Furnace

The completion of the new 500-ton blast furnace of the Anshan Steel Works, raises the pig iron production of the plant to 1,100 tons per day. A very complete description of the South Manchuria Railway Company's program for the expansion of the Anshan Iron Works into a steel enterprise, was published in the February 1929 issue of *The Far Eastern Review*. The old blast furnance plant at Anshan consisted of two 300 tons furnaces producing 200,000 tons of pig iron per year. These original furnaces were erected during the war and have since been worked to their full capacity. The erection of a new 500-ton furnace became imperative to permit the old furnaces to undergo necessary repairs; but it is really intended as a reserve unit in order to assure a constant minimum annual output of 200,000 tons.

The new 500-ton furnace was designed by Mr. Kohlhaas, Consulting Engineer of Perrin, Marshall & Company of New York, but its actual construction was carried out by various Japanese manufacturers; the steel castings being supplied by the Sumitomo Steel Works, the plate work by the Kawasaki Dockyard and other parts by the Dairen Engineering Works. The contract for the hoisting machinery and equipment went to the Otis Elevator Company of New York; the coke screening machine to the Robbins Conveyer Company; the furnace bell and hopper to the McKee Company and the fire bricks for lining the furnace to the General Refractory Company of America. The actual erection of the furnace was carried out by the Anshan Engineers.

The new furnace has a capacity of 500 tons per day. It is 27.43 m. high with a hearth diameter of 5.64 m. and an inner volume of 693 cu.m. The following data was used as the basis for its design:

Analysis of Iron:

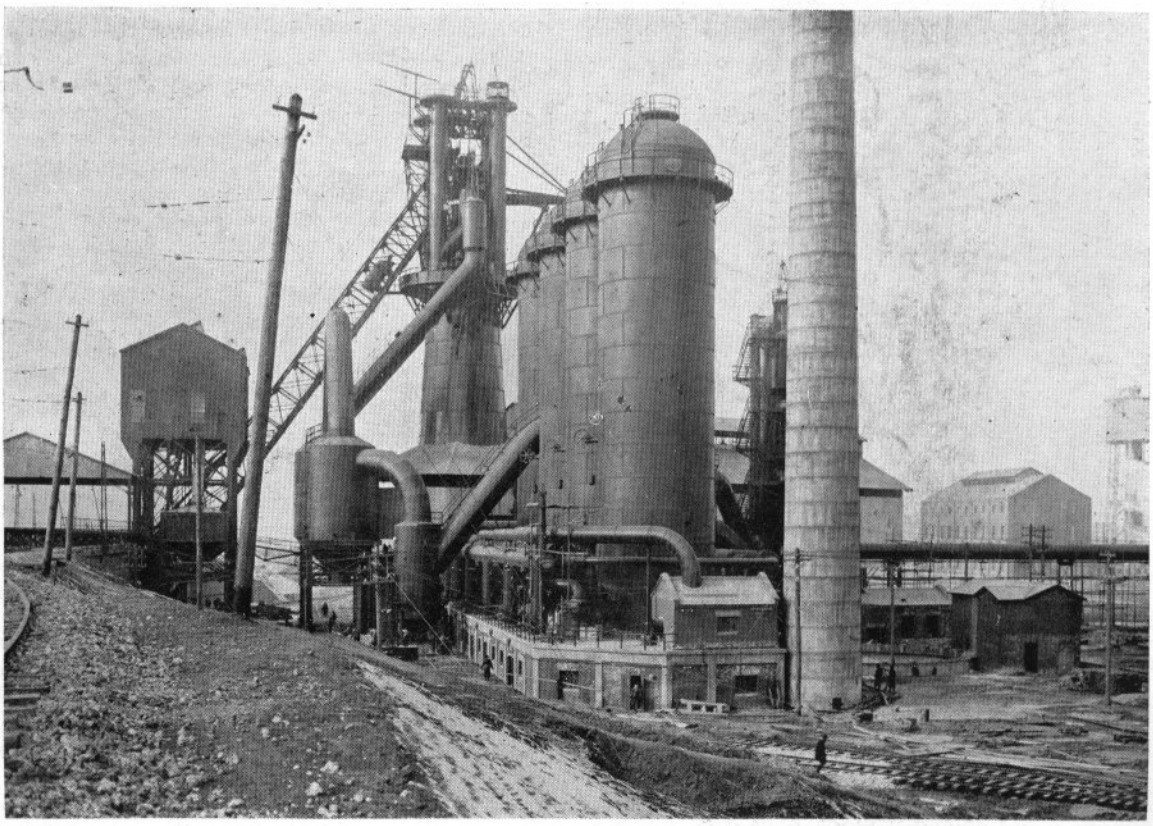
Si	1.50 -	1.80	%
C	over	3.50	,,
Mn	over	1.20	%
S	under	0.04	,,
P	under	0.35	,,
Fe	about	94.00	,,

Metallic Charge:

The furnace is to operate fast all sinter burden with only small amount of iron scrap

sinter	1.750	per 1^t	pig iron
iron scrap	0.025 ^{t}		,,
Coke Rate	1.0^t	per 1^t	pig iron
Lime Stone Rate	0.8^t	per 1^t	pig iron
Slag Quantity	0.9^t	per 1^t	pig iron

(Continued on page 399).

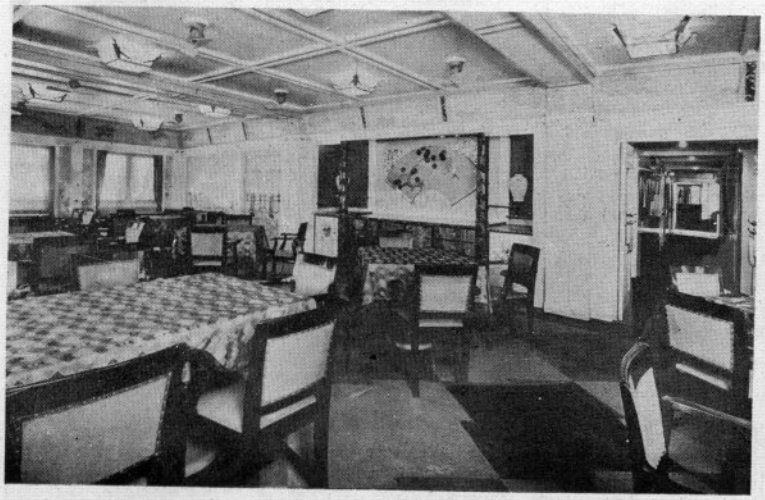


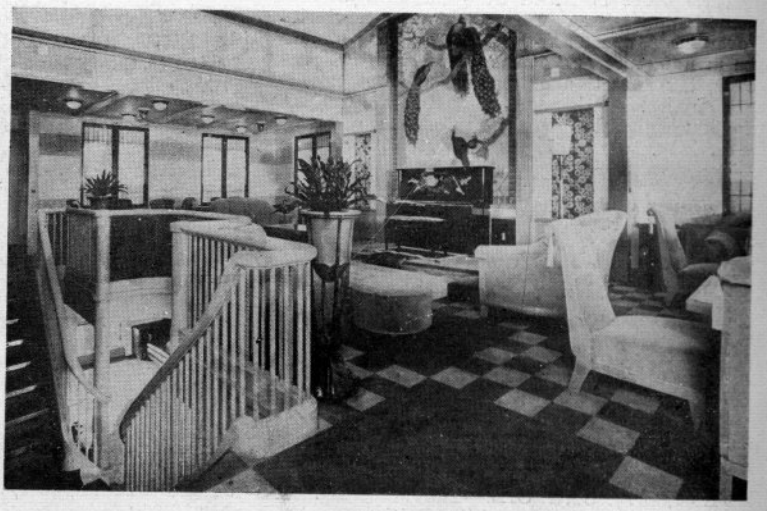
No. 3 Blast Furnace, Anshan Steel Works

O.S.K. New South American Motor Liner "Rio de Janeiro Maru"

(Continued from page 367).

The *Rio de Janeiro Maru* is equipped with two sets of two-stroke single-acting Sulzer six-cylinder engines, with cylinders 680 mm. bore and piston stroke, 1,000 mm., the speed being 120 r.p.m., each motor developing 3,000 B.H.P. There are three Diesel engine-driven generating sets in the engine room, each of the mbeing six cylinder Mitsubishi-Vickers trunk piston, airless-injection type, developing 350 B.H.P. at 310 r.p.m., which is directly coupled with a D.C. generator of a rated output of 230 Kw. 225 V. B.B.C. turbo-blowers, fuel and lubrication oil purifiers, various pumps, refrigerating machinery, etc., are also arranged in the engine room compact and complete. The ship is designed to reach a speed of 17 knots.





"Rio de Janeiro Maru"

First Class Dining Hall **First Class Social Hall**

New 500-ton Anshan Blast Furnace

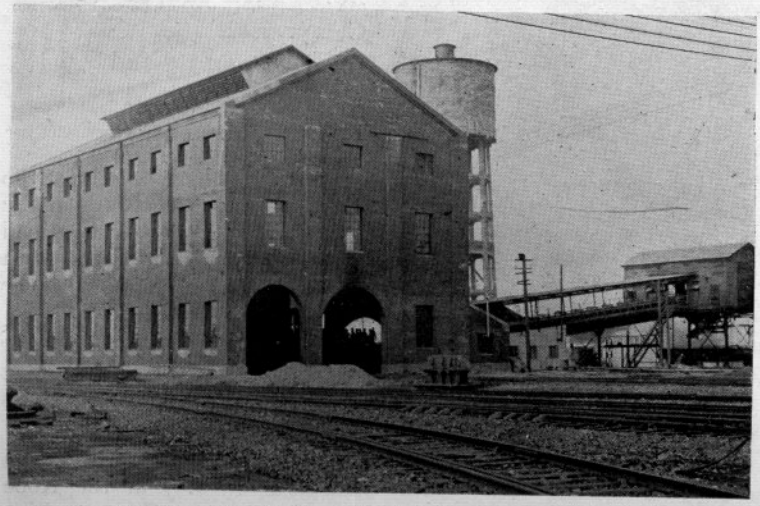
(Continued from page 356).

Summary

The basic figures for the No. III. Blast Furnace are, therefore, as follows :—

Sinter..	.. 1.750t
Scrap	.. 0.025t
Coke	.. 1.000t
Lime stone	.. 0.800t
Slag Quantity	.. 0.900t

The new No. 3 furnace was blown in on March 9 last and has since been producing from 500 to 550 tons of pig iron per day.



Pig Iron Casting Plant: Capacity Maximum, 175 Tons Per Hour

N.Y.K. Liners for the Japan-Europe Service

(Continued from page 381).

THE SECOND CLASS SMOKING-ROOM, located at the rear of B deck, is decorated after the old Spanish style. The wall, the ceiling of light hue, and the bar counter all tone well together. The floor is covered with rubber tile. It is provided with sofas and chairs covered with wither leather or tapestry.

THE SECOND CLASS LOUNGE is located on the starboard side of B Deck adjoining the Smoking-Room. The floor is covered with ruboleum, and the furniture consists of a piano, sofas, chairs and writing desks.

THE THIRD CLASS CABINS, located on D deck, consist of the following compartments :

	No. of rooms.	No. of passengers.
Rooms for 2 persons	3	6
Rooms for 4 persons	2	8
Rooms for 6 persons	5	30
Rooms for 8 persons	2	16
Total 3rd class	12	60

These compartments are all of large size and have berths.

The public rooms for the third class passengers include a smoking-room on B deck, and a large dining-room finished in modern style on C deck. There is also promenade space on B deck.

The vessel has an enquiry office conveniently situated at the fore part of B deck, a photographic dark room, and a hospital with isolated wards.

Furthermore, besides the regular laundry of the ship, the vessel has a small laundry equipped with electric irons for the free use of the passengers.

Engineering Notes

INDUSTRIAL

NANKING PLANS MANY FACTORIES.—Plans for the early construction of a large number of Government factories including woollen mills, leather tanneries, metal works and chemical factories are ordered by the Executive Yuan in a special instruction to the Ministry of Industry Commerce and Labor and the Ministry of Finance.

The order is issued in accordance with a memorandum from the Chekiang Provincial Government, which also proposes that to promote the manufacture and consumption of native products, tax reduction or exemption from transit dues on all domestic goods as well as the holding of a National Native Products Conference should be carried out by the Central Government.

NEW CEMENT FACTORY.—The new Government Cement Factory under construction at Tsang Po, on the western outskirts of Canton, is progressing normally. The construction work has been going on for more than a year, and it is not known when it will be completed and ready for operation. At the present time the management of the works is very short of money. It has made arrangements through the Department of Reconstruction with the Central Bank of China in Canton for a loan of $30,000 with which to build the necessary wharves and godowns.

EMPIRE TUNG OIL.—The experimental cultivation in many parts of the British Empire, including Malaya, India, Africa and the West Indies, of the tree from which tung oil, formerly a Chinese monopoly worth £3,000,000 a year, is obtained, is the subject of a Memorandum by the Imperial Institute, by the Empire Marketing Board.

The Memorandum says that it is too early to state the result of the trials, but the preliminary reports from some of these countries, especially North-East India, are distinctly encouraging.

Tung oil is essential in the manufacture of varnish and is important to the aeroplane, electrical and linoleum industries.

RAILWAYS

NEW MANCHURIAN RAILWAYS.—Referring to the Chinese plan to build a network of railway lines in the Northeast by the Northeastern Communications Commission, Mukden, necessary investigations for the following 3 new lines having been completed, permission for their construction has been applied for to the Railway Department of Nanking Government:—

(1) Chintai-Changchiawan (Yaomen) Line; 80 Chinese *li* in distance; construction cost $3,000,000 to be borne by Kirin Province. Both surveys and construction work will be undertaken by the Kirin - Hailungcheng Line, and be finished in 6 months.

(2) Suihua-Wangkuei Line on the Hulan-Hailun Line; 130 Chinese *li* in distance; building costs $1,200,000 (to be raised by subscriptions.

(3) Chubo-Tungkiang Line, via Tungpin, Fengcheng, Ilan, Huachuan, and Fuchin, 940 Chinese *li* in distance; building costs $30,000,000.

The last mentioned line having an important relation to the frontier defences of the Northeast, work will be taken up without further delay. Already an office therefor has been opened in Kirin.

The Northeastern Communications Commission also plan to build three trunk lines as main arteries of traffic and trade in the Northeast, following the prospective completion of the Hututao Re-construction Works.

(1) Starting from Hulutao (Lienshan Bay) and terminating at Heilo, opposite Blagoveschensk across the Amur, via the Peiping-Mukden, Tahushan-Paiyintala, Taonan-Tsitsihar, and Tsitsihar-Koshan Lines.

(2) Starting from Antung and terminating at Tungkiang via Tunghua, Hailungcheng, and Tunhua.

(3) Starting from Chinchow (on the Peiping-Mukden Line) and leading to Jehol via Yichow and Chaoyang.

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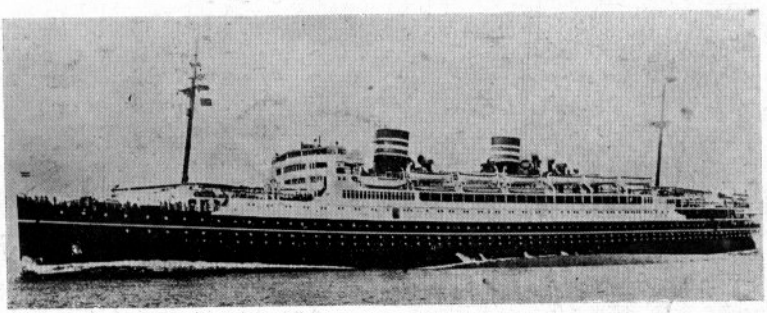

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ASIATIC MARINE REVIEW

Vol. XXVI | AUGUST, 1930 | No. 8

Chekiang Development Program

EDITORIAL FOREWORD: In the June issue of *The Far Eastern Review* appeared an article on the "Construction Program of the Chekiang Electricity Bureau," outlining that part of the provincial development plan coming directly under the supervision of that bureau. The following brief summary of the other main features of this construction program will give a more comprehensive idea of what Chekiang is trying to accomplish on its own initiative and credit. In the editorial article entitled "Models" in this issue of this magazine, we have drawn some sharp comparisions between the spirit of progress that characterizes the policy of the Nationalist Government and the cold, calculating ambitions of the Northern War-Lords. At a time when so much destructive energy is being displayed throughout all parts of China, it is refreshing to be able to comment with approval on such commendable constructive programs such as are being carried out by the Provincial Government of Chekiang and the even more important administrative experiment in the Chungshan district of Kuangtung, directed by China's veteran statesman, Mr. Tang Shao-yi. These two programs typify what Nanking has been trying to accomplish on a larger scale by devising huge schemes for the development of railways, highways, port works, city planning and other public improvements, whose execution has been postponed owing to the fact that the funds have all been swallowed up in purchasing the allegiance of Northern War-Lords, subsidizing a lot of bandit chiefs and carrying on wars to maintain its authority. Nanking can be fairly criticized for concentrating on these enormous development schemes and appropriating funds for their execution at a time when the dictates of humanity call for the marshalling of all its resources to save the lives of its starving millions, but on the other hand, it is evidence of a will to develop the country along modern lines and provide work for the masses.

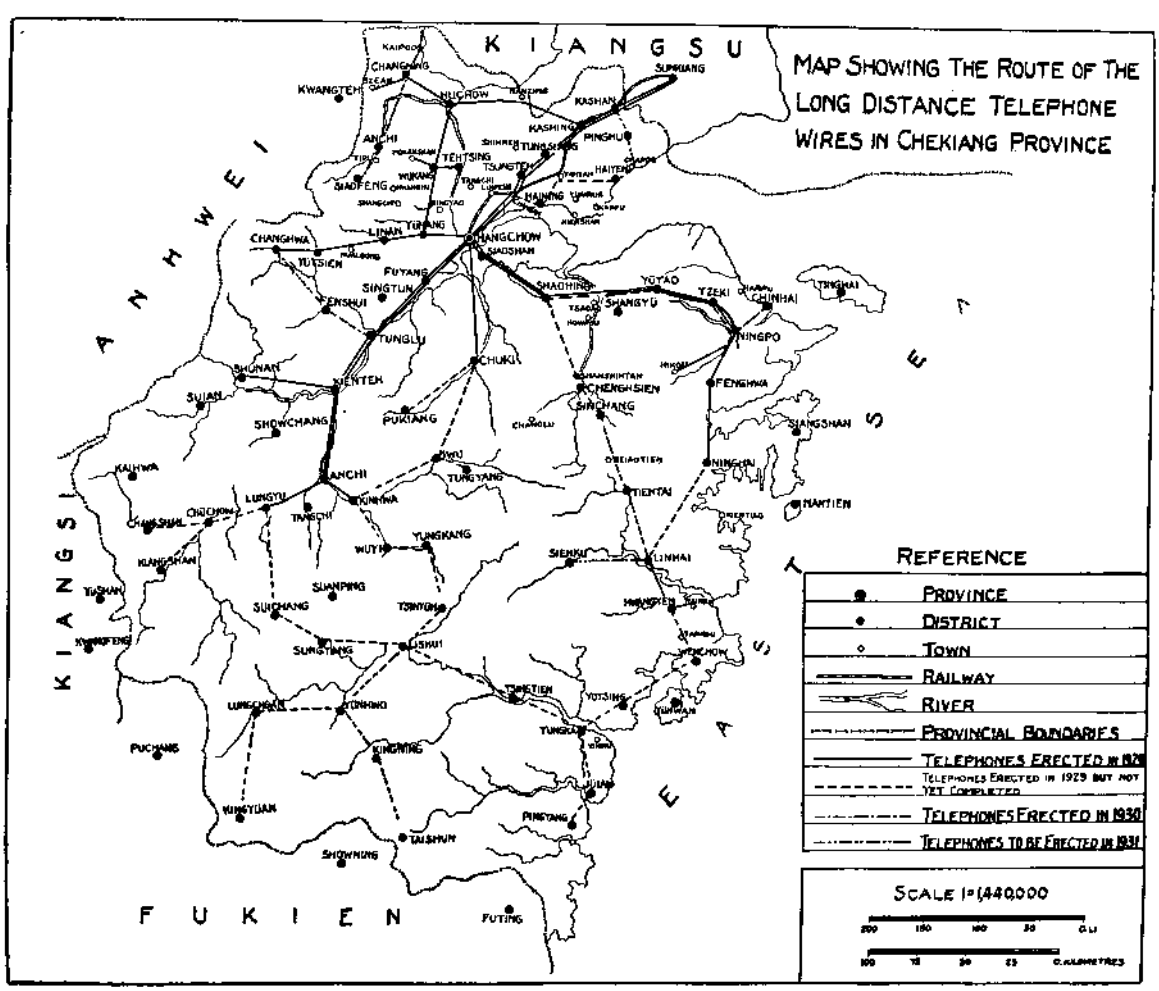
Although Chekiang's claim to the distinction of being the Model Province of China is perhaps premature, there is every indication that if internal political conditions do not cause a complete breakdown of its program, it will be entitled to this honor. The program, as outlined below, is an extremely modest one, calling only for the initial expenditure of ten million dollars silver, but even this small sum, honestly applied under proper engineering supervision, can do wonders in China. In addition to the provincial government program there are other interesting private railway projects being carried forward in Chekiang and then there is the Health and Sanitation program that the Chinese Government has agreed to start in collaboration with the Health Section of the League of Nations in Chekiang in order to make this province the Model for the rest of China.

The North accuses Nanking of having accomplished nothing in a constructive way but the Chekiang program is evidence of a spirit of provincial initiative and progressiveness under the rule of Nanking that could not be conceived and carried out by any province north of the Yangtze under the heel of the Pei-Yang militarists. It is true that Manchuria, under the absolute rule of Marshal Chang Tso-lin and his generals, carried into effect a remarkable railway and industrial development scheme, but the funds which made this possible were wrested from the people by compelling them to hand over their crops to an official combine who paid for them in nice, new, incontrovertible paper notes. The combine then sold the produce for hard cash. The Manchurian farmers accumulated trunk loads of worthless paper and their overlords pocketed the gold. Over $500,000,000 (silver) a year was obtained in this way from the soya bean crop alone. It is roughly estimated that Chang issued nearly seven billions of these notes over a period of four to five years and he must have received its equivalent in hard cash from the sale of the beans and other cereals. Had Nanking enjoyed the handling of the enormous sums raised by, Mukden, Kirin, Tsitsihar and Harbin, it would not only have established its rule over the whole country, but realized its most important construction schemes. Seven billion dollars in paper notes converted into silver, would have built 70,000 miles of railways, or let us say 20,000 miles of railways, all the port works and other public improvements conceived by Dr. Sun Yat-sen, liquidated all of China's indebtedness and still leave a billion for relieving poverty and destitution throughout China!

* * *

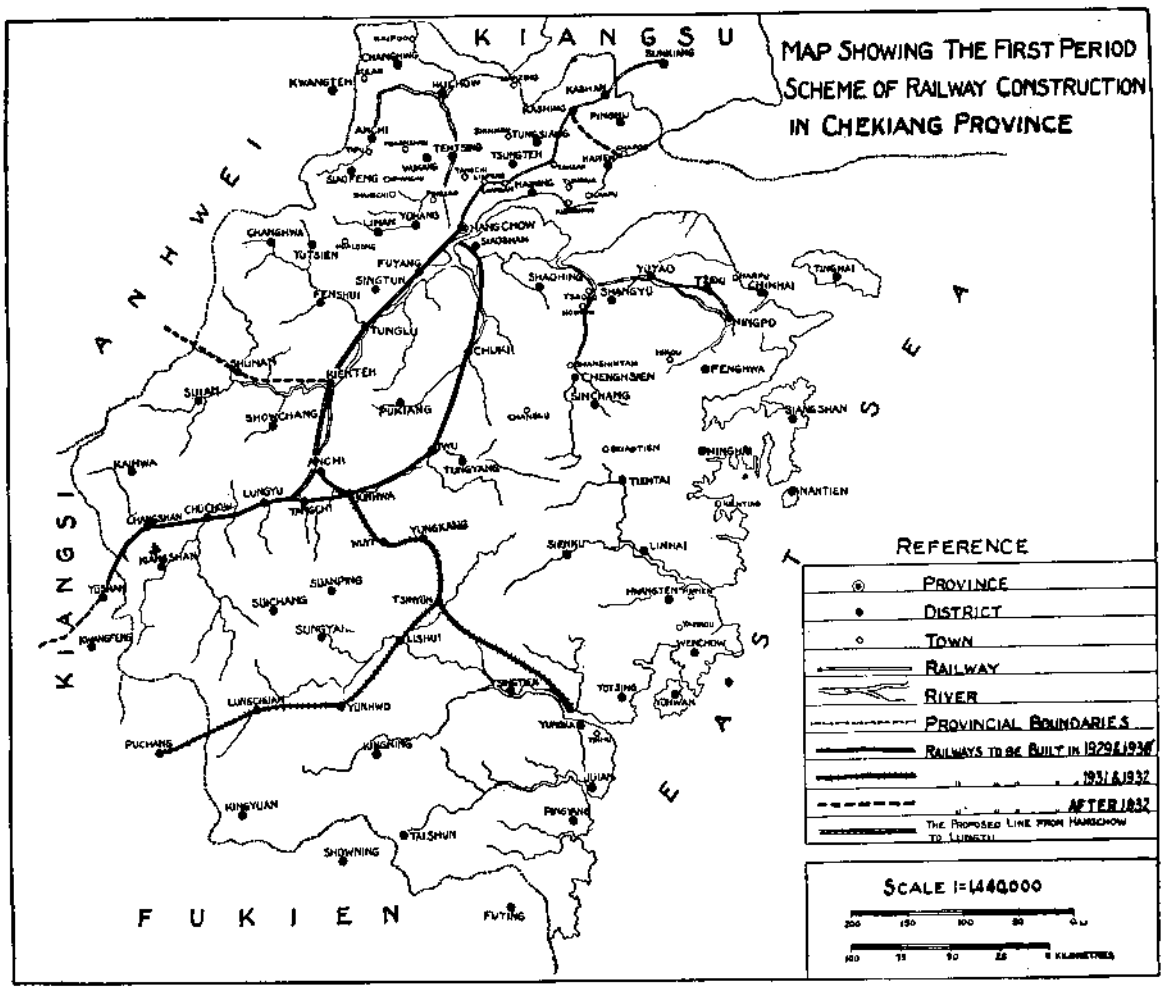
The Chekiang Program

The Chekiang Provincial Government has laid down an extensive program of development covering electric light and power, communications and river conservancy to be carried out over a five year period. Construction bonds to the amount of $10,000,000 have been authorized and issued at 98 drawing 8 per cent. interest, payable semi-annually. They are to be retired in eighteen install-

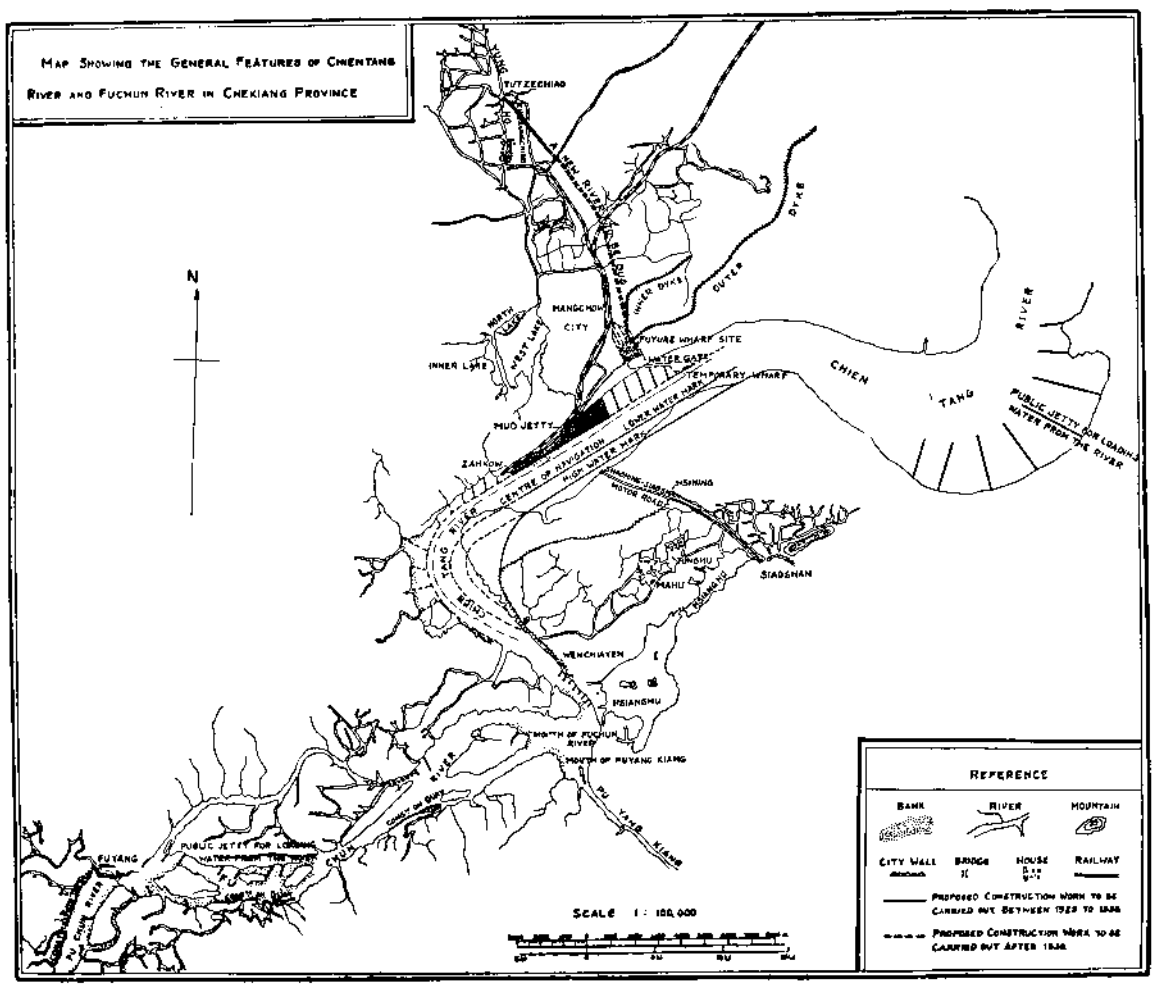


Long Distance Telephone

ments at six months intervals during a period of nine years and secured by the revenue from a surtax on land, from which $1,600,000 per annum is set aside for the service of the bonds. Of the proceeds of this issue, $1,980,000 have been allocated to the Provincial Electricity Bureau to carry forward its program of extension. The Electricity Bureau as the first step took over the Dah Yoh Lee Electricity Works of Hangchow. The five year program involves the construction of a 15,000 kw. initial unit for a generating station at Hangchow, the reconstruction of the present electrical distribution system in Hangchow and the construction of transmission lines to Yuhang, Kashing and Huchow. The construction of irrigation and drainage plants and the addition of a second 15,000 kw. unit to the Hangchow plant and an electric tramway system for the city of Hangchow are expected to be started during this period. The plan also contemplates the erection of an electric testing laboratory. The Chekiang Commission of Construction is aiming electrifying the whole province and the first central station of a super-power steam system will be the one at Hangchow, the provincial capital.



Railway Plan



River Improvement

Communications

The Commission has also drawn up an elaborate program for railway and highway building, long distance telephones and a radio system. In 1929, there were only 270 kilometers of highways in the province. The report for the current year shows 600 kilometers, and it is expected that by next year there will be 1,100 kilometers. The Commission emphasizes that more consideration must be paid to making the existing roads pay by encouraging and increasing the traffic and that the profit from their operation be set aside as a special fund for further road construction. The number of buses and trucks in Chekiang in 1929 was 95, which increased to 110 in 1930. The program calls for the purchase of an additional 600 trucks and buses to be ready for service in 1931.

Railway communication in Chekiang is at present confined to the Shanghai-Hangchow-Ningpo Line with a total length of 189.57 kilometers. The construction program

provides for the completion of the three following additional provincial lines:

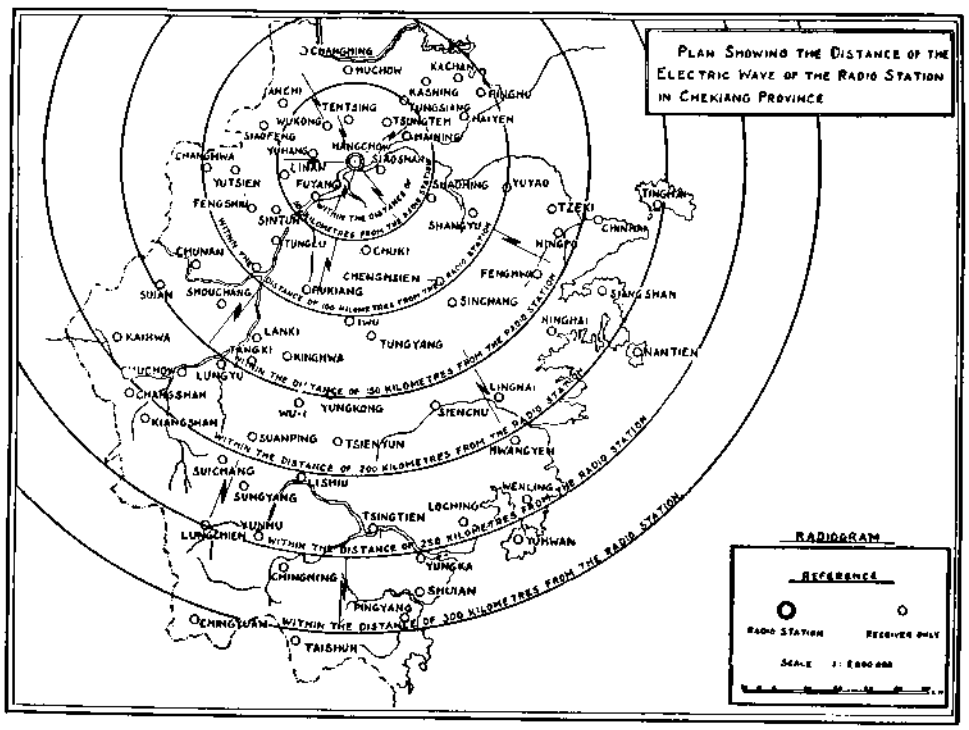
1. Siaoshan-Changshan Line, 315 kilometers.
2. Kinhwa-Yunkia Line, 180 kilometers.
3. Tsinyun-Puchen Line, 170 kilometers.

These lines will be connected with the Shanghai-Hangchow-Ningpo Railway and form the skeleton of the future provincial system. The total estimated cost of the above three lines is $23,700,000 silver, or approximately $60,000 (silver) per mile. (With exchange at its present level, these estimates will have to be doubled). Work is to be started this year and completed by the end of 1933.

Telephones

The long distance telephone program is an ambitious one. Started in 1929, when completed, it will link together practically all the cities of the province. A systematic annual plan of construction is being followed. In 1929, thirteen long distance telephone lines were strung:

(Continued on page 414)


PLAN SHOWING THE DISTANCE OF THE ELECTRIC WAVE OF THE RADIO STATION IN CHEKIANG PROVINCE
WITHIN THE DISTANCE OF 100 KILOMETRES FROM THE RADIO STATION
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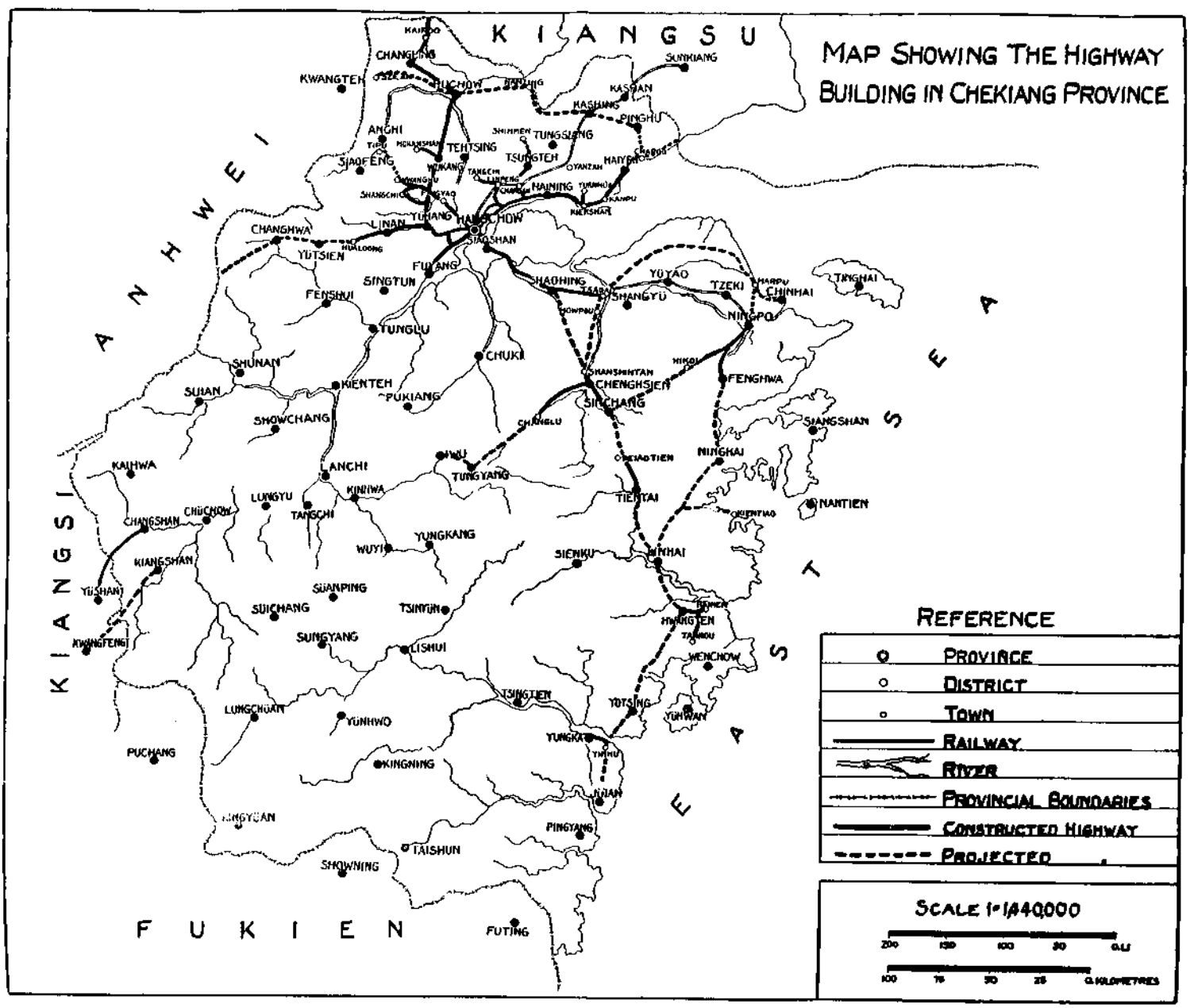
RADIOGRAM
REFERENCE
RADIO STATION
RECEIVER ONLY

Radio



Highways

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ASIATIC MARINE REVIEW

Vol. XXVI SEPTEMBER, 1930 No. 9

The Chinese Eastern Railway

Mid-Summer Thoughts on a Red-Hot Subject

THE dog-days have come again and as usual at this season, somebody in Europe develops a brain storm about the Chinese Eastern Railway and starts the rumor that a nameless American financial group is trying to acquire the property from the Soviet. This year, the story telegraphed from Berlin, has gone the rounds of the press and evoked the usual surface anxiety in Japan. The German rumor is to the effect that the Soviet Government is negotiating to buy all the French shares in the Russo-Asiatic Bank at 67 per cent. of their face value with the object of selling them to an American syndicate who will then pay 42 per cent. of the purchase price of the C.E.R. to the Soviet, whereupon the line will be operated as a joint Sino-American enterprise. Whoever started this latest rumor, at least had a fairly intelligent grasp of one almost insurmountable difficulty surrounding China's purchase of the line by means of an international loan; always provided, that the Soviet Government consents to surrendering its interests in this manner.

At the height of the Sino-Soviet conflict last summer, interested parties unofficially approached the American Government and bankers to ascertain their attitude towards an American or international loan to China for the purpose of purchasing the Soviet's rights in the C.E.R. Such a proposition could be handled in the United States only by the official American Group in the Consortium and with the approval of the State Department and then communicated to the other groups and referred to their respective governments. The veto of any one of these three Powers, (Great Britain, France and Japan) would be sufficient to kill the project, for although any one group can go it alone if the others decline to participate, no American group would underwrite such an important Chinese loan without the co-operation of the others, and, where Manchuria is concerned, a full understanding and partnership with Japan.

Although inactive since its birth, the Consortium is by no means dead. The Chinese cherish the illusion that by withholding official recognition, they destroyed its usefulness, but until its dissolution is announced, this international grouping of bankers stands as the official instrument of the Powers concerned in dealing with Chinese finances and its chairman becomes in point of fact the official spokesman for the four governments in any matter involving the credit of the Chinese Government. This position is held by Mr. Thomas W. Lamont of J. P. Morgan and Company. Mr. Lamont went out of his way last year to attend the meeting of the International Chamber of Commerce held at Amsterdam in order to deliver an address on China's financial difficulties. In a polished, sympathetic but forceful ten-minute statement, he told the Chinese that they could expect no financial assistance until they put their house in order, established and consolidated the authority of a Central Government, evinced some willingness and intention to pay defaulted loans and commercial debts and respect revenues pledged for the service of past obligations. Conditions in China have not changed for the better since last July.

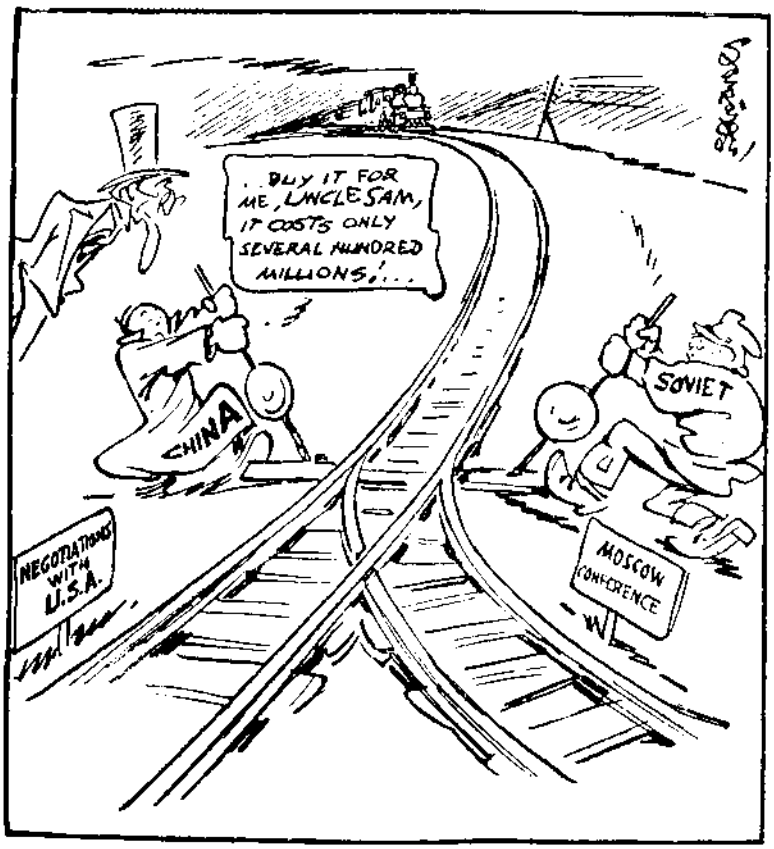
From the Chinese viewpoint, the purchase and incorporation of the Chinese Eastern Railway into their own system of state railways is essential to restoring their full sovereignty over Manchuria, the first step towards bringing pressure to bear upon Japan to sell the South Manchuria line and surrender the Liaotung Lease. But in both the 1924 and 1925 Agreements between China and the Soviet, it was stipulated that China could purchase the Soviet's interest in the line only with Chinese capital and, furthermore, that no third party should interfere in the future of the line. Neither side can therefore enter into negotiations for the sale or surrender of their interests without first obtaining consent of the other. The mere mention that China wanted to buy the Soviet interest in the line last year, evoked such a prolonged cachinnation from Moscow that it is hardly conceivable that within a year the Soviet would reverse its attitude towards a property so essential to the success of its immense plans for the rapid development of Siberia and Central Asia. Instead of loosening its hold, it would not be surprising if Moscow demands the cancellation of the Peking and Mukden Agreements and a return to the original status of the line.

Owing to the Soviet's repudiation of the old Czarist and Kerensky debts, the French, who for many years financed Imperial Russia, now claim an equity in the C.E.R. as being the only Russian property of any value outside the jurisdiction of the Soviet. Although the French have no legal claim, it is obvious that if the Soviet should ever consent to sell the property to China and accept the proceeds of a foreign loan in payment for its rights, such a loan would be stubbornly opposed by France unless some assurance be given that her "equity" be liquidated. Now, it is possible to raise such a loan through a British, American or Japanese group, but it is extremely doubtful whether these groups would double-cross their French partner in such a cold-blooded manner. It does not require any elaboration of the situation to understand that the French will never participate in a transaction that would benefit the Soviet financially unless some part of the money so raised is set apart to satisfy her claims. As such a loan would have to be international in character, with full participation for French interests, it is again obvious that until the Soviet is willing to hand over the proceeds of the loan to France, this solution of the problem stands no more chance than the proverbial snowball in hades. By the same reasoning, it is highly improbable that the State Department would give its approval to an American loan to the Chinese Government whose proceeds would be handed over to the Soviet, until such time as the latter is willing to acknowledge and repay the debt of the Kerensky Government to American investors. The situation is very similar with the one which makes impossible French participation in such a transaction. Therefore, there is some slight basis for the recent Berlin rumor, probably inspired by Paris, to force a statement from Moscow in order to keep the record straight.

China is very anxious to purchase the line, if the Soviet will consent to sell, but until some agreement is arrived at for the liquidation of the French equity, the proposition seems hopeless. On the other hand, if it were true, now or at any time in the future, that the Soviet Government is disposed to accept an American or international loan in payment for its rights in the C.E.R. and to hand over the line to China and America, relinquishing control over its main artery of traffic, there must be some compelling reason other than financial, to explain this sudden abandonment of Russian policy. At the precise moment when the Soviet is spending billions of dollars to expedite its great development program, involving complete rehabilitation and modernization of the Trans-Siberian railway, why should it be willing to surrender the main link in its through transportation scheme for a problematical share in a paltry $350,000,000. Beware of the Greeks bearing gifts!

The explanation, if there is one, must be predicated on the supposition that the Soviet has thrown overboard the traditional Muscovite aims and aspirations in Eastern Asia and intends to concentrate its political and economic activities in territory West and Southwest of Baikal. Thirty million Chinese ruled by a group of bellicose war-lords, backed up by the determination of Japan to protect its vested interests in Manchuria, has erected a formidable barrier against any Soviet advance in that region. But there is no such obstacle to Soviet penetration into Mongolia and Hsinkiang. There, in Central Asia, the Soviet is supreme and can be reached in a military way only by a Chinese army using the Chinese Eastern Railway to invade her territory from the east. Now, if the C.E.R. was handed over to an American or international group, thus effectively neutralizing its value as a strategic instrument, the Soviet could work out its program in Central Asia safe from any possible outside interference. On the other hand, all this could be avoided by holding on to what she has and demanding a return to the pre-1924 status.

An American loan to China to acquire the Soviet's rights in the C.E.R., means an international loan and the neutralization of North Manchuria, a precedent for bringing the same pressure to bear upon Japan to surrender the S.M.R. to the same group. This brings Japan, the real Power in the Far East, into the picture. In the first place, it can be categorically stated that the official American group would decline seriously to discuss such a matter with China



(North-China Daily News)

The Pointsmen on the C.E.R.

without a full and frank understanding with their Japanese partners. Unless Japan is willing, the deal falls through. So, when we hear that an American group is negotiating either with China or the Soviet for the purchase of the C.E.R. and the Japanese express astonishment, it is safe to conclude that the story has no foundation in fact. It is inconceivable at this juncture that any American financial group would waste its time over a proposition that without Japan's approval and participation, would receive little encouragement from the State Department. On the other hand, should the Chinese succeed in interesting an American group in such a loan and should the Soviet Government intimate a willingness to forego its rights under the Peking and Mukden Agreements and accept payment from the proceeds of such a loan, there is no doubt it would prove highly attractive as a purely financial proposition, but investigation and study would uncover so many political obstacles as to compel its abandonment.

In the first place, the $350,000,000 valuation put upon the property by the Soviet is prohibitive, even though the line could be made to pay the interest on the loan and leave a handsome surplus. According to Russian reports, the line actually cost about $175,000,000, but against this is set the fact that it was never intended to earn a profit or to serve its fundamental utility of developing the territory traversed. It was conceived as a strategic weapon under the terms of a secret alliance between China and Russia signed in May, 1896, for the exclusive purpose of carrying out the terms of this alliance and facilitating the transport of the Russian armies to points on the Korean frontier, preparatory to a war with Japan. Had the Japanese known of the existence of this alliance at Portsmouth, they would have been justified in demanding the whole of South Manchuria from China as an indemnity for her share in bringing about a war that could never have been fought, had the Russian armies not been entrenched in Chinese territory. Despite the findings of voluminous expert reports compiled for the Washington Conference that the legal position of the C.E.R. is defined by the commercial convention of September, 1896, the real status of the line was clearly determined by the terms of the secret alliance signed four months previously and revealed officially to the world, a few days after the above expert report was submitted to the Conference.

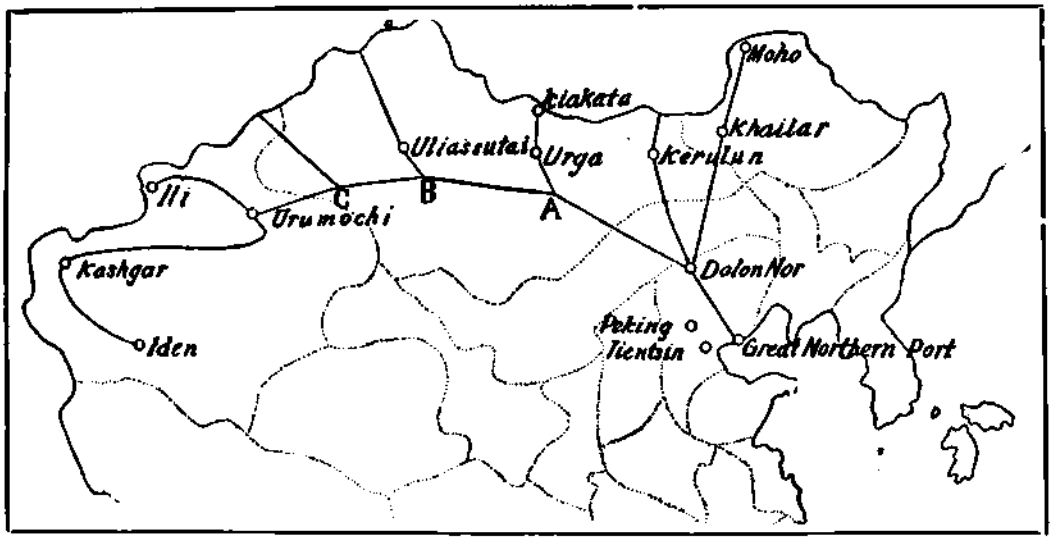
That the C.E.R. was not expected to pay a financial return on the investment is clearly indicated by the fact that for twenty-four years it never covered expenses, the deficit being met annually from the Imperial Russian Treasury. Not until its administration was turned over in 1922 to a new joint board of directors headed by Dr. C. C. Wang, one of China's most competent railway administrators, did the line show a profit from operation. Since then, the annual profits of the line increased steadily and in such a proportion that by 1930, they should have been well over $15,000,000 gold, with the prospect of increasing this steadily to twenty or twenty-five millions, or ample revenues on which to secure a loan to cover the actual costs of construction, subsequent improvements and appreciation in value.

Now, just at the moment last year, when American bankers were considering the possibilities of a loan to China for the purchase of the Soviet interests, basing their calculation of the size of the loan on the alleged cost of the line ($175,000,000), Mr. Mantell, the railway adviser to the Nationalist Government, gave out an opinion which was broadcasted over the world, that the line could easily earn $30,000,000 or more a year. Naturally, such a statement coming from this source, made it possible for the Soviet to value the property based on its earning capacity, and when we are now informed that Moscow places a $350,000,000 valuation on the line, the Chinese have no just cause to protest against a valuation their own expert has indicated as most reasonable. If the C.E.R. was absolutely essential to the future prosperity of China; if it was the only outlet to the territory served, it might be good economic and political wisdom on the part of China to acquire it at any price. On the other hand, standard gauge railway construction over the level Manchurian plain should not exceed $30,000 (gold) per mile and allowing for even $100,000 a mile over the Kinghan mountain section, the Chinese could duplicate the C.E.R. for an average cost of $50,000 a mile, or a total of about $50,000,000, providing they are foolish enough to build another railway that diverts the trade of Manchuria to a port outside their own jurisdiction. The same amount of money expended in extending the present system of Chinese lines in Manchuria, tapping and opening up the Amur, Hailungkiang and Inner Mongolian regions and carrying their produce southwards towards Newchwang or Hulatao, would serve China's real interests to a greater degree than taking over a line whose deep-water outlet at Vladivostok can be reached only through Soviet territory.

It is a remarkable commentary on the whole C.E.R. controversy and the many expert reports on its valuation, that no one to date has challenged the Russian figures as to the total cost of construction of the Manchurian cut-off of the Trans-Siberian trunk line, which is placed in round numbers at Roubles 350,000,000*. As a matter of fact, this figure actually represents the original official estimate of the cost of the seven sections of the entire Trans-Siberian line from Cheliabinsk to Vladivostok *via* Stertinsk, Blagovestchensk, Khaborvsk and the Ussuri River. The official estimates covering every conceivable item of land purchase and expropriation, buildings, administration, construction, telegraphs, telephones, rails, bridges, rolling stock, etc., for the entire 7,112 versts, was exactly Roubles 350,210,428, or an average of Roubles 49,242, per verst, or say, $34,000 gold per mile. When the Russian engineers based their official estimate on this figure and carried out the main Trans-Siberian construction within its limits, it is difficult to understand how the 1,000 mile Manchurian cut-off could cost as much as the entire Trans-Siberian system. Our estimate of $50,000 per mile, or $50,000,000 to duplicate the C.E.R. as it stands to-day, is conservative, one that would leave a profit of from ten to fifteen thousand dollars a mile to any experienced constructor who took the job on a lump sum basis. As a matter of fact, the late George Pauling agreed to build the entire Chinchow-Aigun Railway at a lump sum cost of $40,000 gold per mile, and this included a liberal profit. Some of the lines since built by Sino-Japanese engineers in the same territory, has cost about $25,000 gold per mile. So why pay the Soviet $175,000 a mile for a line that can be duplicated for one-sixth the cost?

We have no hesitancy in saying that under competent direction and honesty in handling the funds, that the amount of money involved in purchasing the Soviet's rights in the C.E.R. at the alleged original cost of construction of $175,000,000, would not only build the seven thousand miles of Mongolian and Manchurian defense lines of Dr. Sun Yat-sen's development scheme, but construct the Great Northern Port as well. To talk of double that amount ($350,000,000) as indicating the value of the property, is idiotic.

* According to the Soviet official C.E.R. accounts, the total cost of construction of the road was U.S. $223,332,502, including the cost of the South Manchurian branch to Dairen, amounting to $40,507,732.



CHINA'S ONLY ANSWER TO THE SOVIET FIVE AND FIFTEEN YEAR PROGRAM

Sketch Map of Dr. Sun Yat-sen's scheme for the Defence and Colonization of Manchuria and Mongolia, covering about 7,000 miles of new railways across practically level territory. These lines could be built at an average cost of $25,000 per mile.

It is only necessary to glance at the attached map, to realize that Dr. Sun Yat-sen's scheme of Manchurian and Mongolian defense and colonization railways, radiating from his proposed Great Northern Port, is not only the sole strategic guarantee that China's integrity will be preserved in these regions, but that its vast trade will flow into and out of a port entirely under Chinese jurisdiction. The purchase of the C.E.R. at a figure that would make possible this great dream of the man whose ideals, aims and aspirations are now the guiding principles of the recognized government of China, is a betrayal of all that he fought for during his lifetime. Dr. Sun-Yat-sen was the only Chinese who envisaged the future "menace from the direction of Urga" and outlined the plans for his country's defense.

If the C.E.R. is ever taken over by an American or international syndicate as security for a loan of $350,000,000, there will be some provision in the agreement protecting the property against competitive lines diverting the traffic from its territory. No hard-headed group of practical business men would dream of advancing $350,000,000 or even half that sum on a property whose main source of revenue would be dependent upon the through Trans-Siberian traffic and place their investment at the mercy of a government which at any moment could divert this traffic over its Amur line, isolating the C.E.R. and transforming it from a main artery of world communication to a purely local line with no outlets or terminals. This constant menace would make imperative that the C.E.R. under Chinese-American or international direction, should have every facility to extend branches in all directions and be connected up with the general system of Chinese railways in Manchuria, with their outlet within Chinese territory, either at Hulutao or the proposed Great Northern Port of Dr. Sun. This again would suggest that the safety of the investment calls for international control of certain Chinese key lines in Manchuria which would serve the C.E.R. as an outlet without using the S.M.R. and the port of Dairen. With the ever present possibility that the Soviet might divert its through traffic over the Amur Railway and change the status of the C.E.R. to a local line whose only outlet would be over certain Chinese railways, the proposition loses much of its attractiveness.

Now, the security for such a loan, under the present condition of China's finances and credit, would necessarily have to be a first mortgage on the physical property and earnings of the line, and as China has no other assets or revenues to make up any deficit, the bondholders would demand as additional safeguards, complete control of the administration, finance and operation of the line with guarantess of police protection such as China at present cannot extend. On the other side, the Chinese with their ideas of sovereign rights and natural desire to handle the finances of the line, would never consent to such terms, nor could they guarantee to the satisfaction of any foreign investor that efficient police protection would be forthcoming. The negotiations would come to a deadlock.

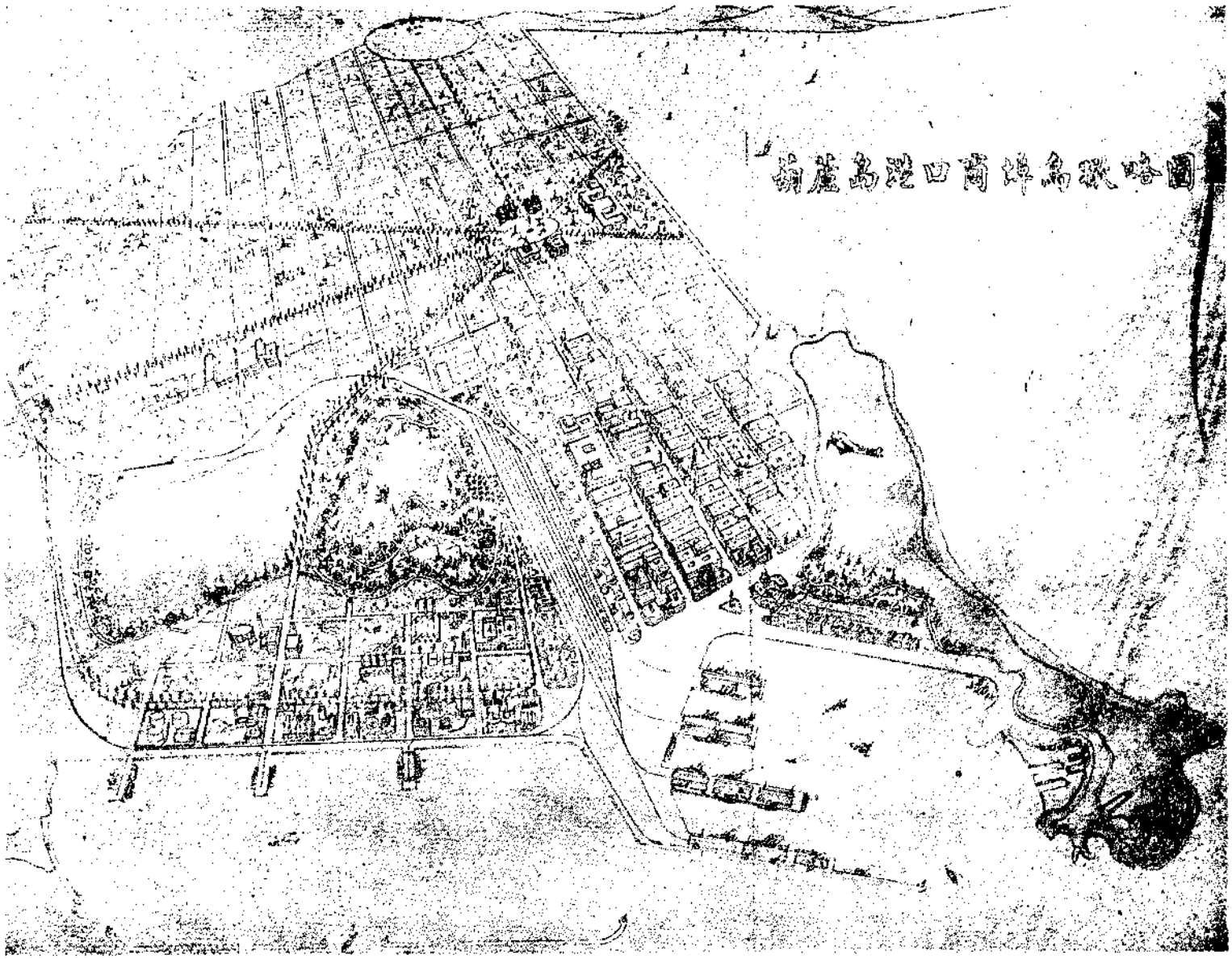
In the words of a prominent American financier, "we are not building any more railways in China for the militarists to play with." In regard to an American loan for the purchase of the C.E.R., another well-known banker suggested that the only acceptable guarantee for the profitable operation of the line under an international loan agreement, would be to hand its management over to the South Manchuria Railway organization and operate both systems as a unit under the guarantee of Japanese protection, or consolidate all the Manchurian lines under an international control, supervised by Japanese experts; which is only the Knox Neutralization Plan reconstructed to meet conditions created by China's inability to stabilize her government, guarantee protection against bandits and military seizure of the property.

Although such a solution might conceivably be acceptable to Japan, it would never appeal to the Chinese, or, for that matter, to the Soviet. So, any way we turn in discussing the sale of the C.E.R. we find ourselves up against a stone wall. The Soviet Ambassador at Berlin has advised the Japanese Foreign Office that there is no truth in the report originating in Berlin. This settles the matter until some tyro in Far Eastern affairs gets another brainstorm.

In conclusion, it is well to bear in mind that the Soviet is in no mood to placate further the Chinese. In an ill-timed gesture, designed to promote Soviet influence in China at the expense of the other Powers, Moscow generously surrendered its extraterritorial rights and a half interest in the administration of C.E.R. to the Chinese, The Soviet has since been compelled to undergo the humiliating experience of being repeatedly and vigorously kicked on a very sensitive part of its anatomy by a succession of provincial Chinese war-lords and their underlings. Within five years, the Chinese seized every other Soviet property in the C.E.R. zone. Deprived of extraterritorial protection, Russians were denied legal protection, persecuted, abused, treated like cattle, and subjected to outrage and indignities such as no white race ever before experienced at the hands of Asiatics.

All through this ordeal, the Soviet did nothing but protest diplomatically to a government who could not control the actions of the Kirin Tuchun. This military despot believing that Moscow was impotent or afraid to assert its rights, very properly, according to the time honored Asiatic conception of politics, administered the last resounding kick to the Soviet's anatomical hinterland, by ousting her from control of the C.E.R. The Soviet is still rubbing the sore spot and applying ointments to the bruise. Its prestige has received a severe jolt. Before it can proceed with its plans in Central Asia and retrieve its lost influence over the peoples it hopes to dominate, it must recover its lost honor. This will not be facilitated by selling the C.E.R. to China, an act which will be interpreted throughout Asia as an open acknowledgment of weakness, a recognition of China's superior strength.

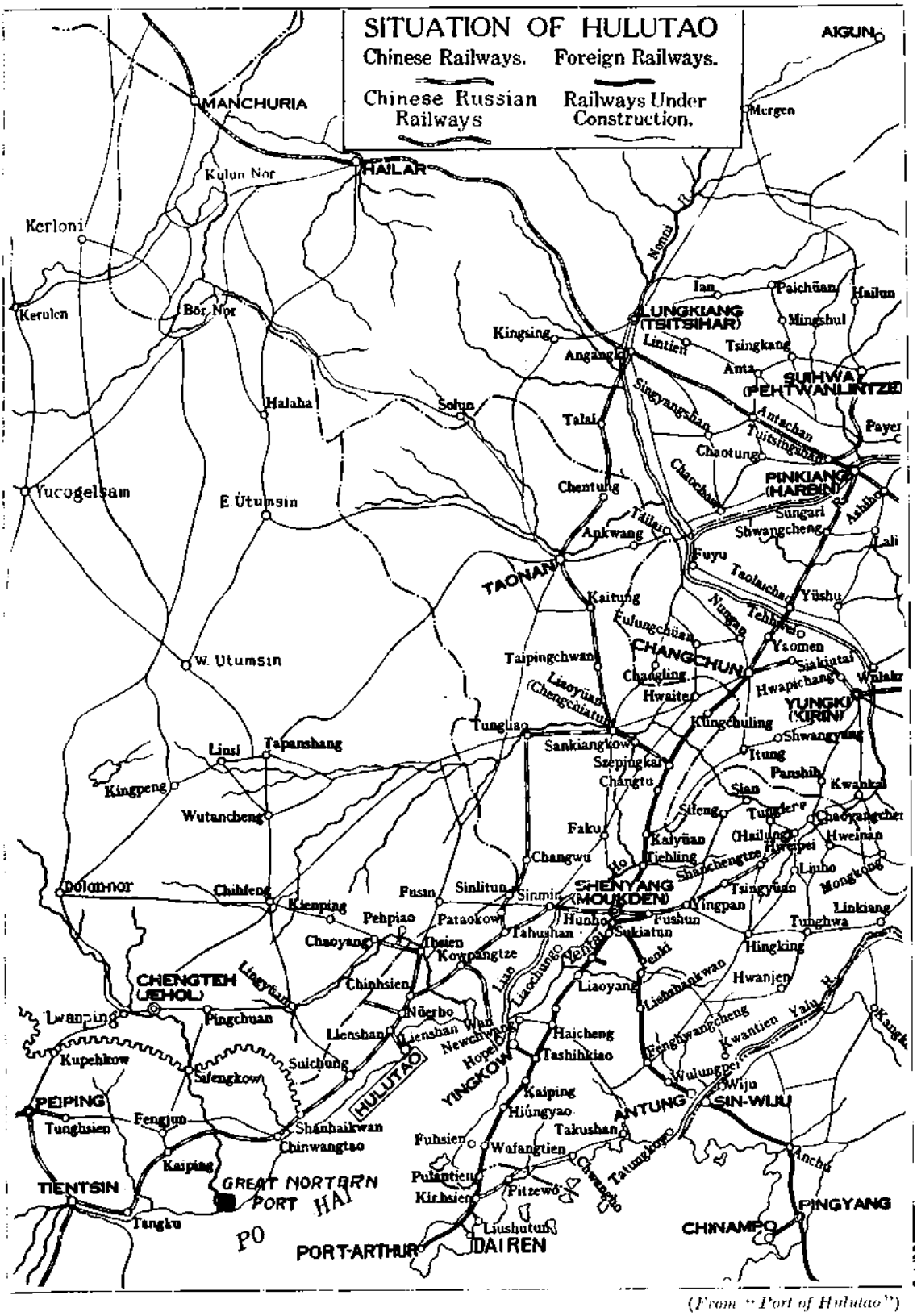
It is all very well to advance the argument that the Soviet has much to gain by retaining friendly relations with China, even to sacrificing her interest in the C.E.R. Moscow tried this once and is smarting from humiliations heaped upon her as the result of her magnanimous diplomacy. We do not envisage any further sacrifices on the part of the Soviet in order to curry friendship with China, concessions that in the very nature of things will be interpreted as a confession of weakness and undermine her influence with the Mongols and tribes of Central Asia. On the contrary, all signs point to a hardening of Soviet policy, a determination to regain her lost prestige and assert her supremacy in Asiatic affairs. There is no other interpretation to her feverish activities in pushing to completion her Five and Fifteen Year Plans, for the development of her Asiatic territories.— G.B.R.



Plan of Hulutao Harbor and Proposed Street System of New Port

Conservancy Works in China

[EDITORIAL FOREWORD:—The following résumé of the official report of the Conservancy Department of the National Construction Commission on its accomplishments during 1928-29 and its plans for the future, are of interest as indicating the set policy of the Nationalist Government to adhere faithfully to the plans laid down by Dr. Sun Yat-sen for the development and reconstruction of China. There may be a legitimate cause for protest on the part of British interests for the diversion of the surplus profits of the Peking-Mukden railway to finance the Port of Hulutao construction, but as long as these protests go unheeded and the work is pushed ahead, the scheme will be realized and the port will serve its purpose of attracting the traffic of the Chinese owned railways in Manchuria and Mongolia to this much needed deep water outlet in Chinese territory. The development of Manchuria will provide enough traffic to keep both Dairen, Newchwang and Hulutao busy, as well as Seishin in Korea, when through rail connections with Kirin are completed. The urgent necessity of a Great Northern Port as outlined in Dr. Sun Yat-sen's scheme either between Taku and Chingwangtao or at Hulutao, is made clear in the article appearing in this issue on the Chinese Eastern Railway. Such a port under purely Chinese jurisdiction, with its strategic and colonization railways reaching out to the Far Western borderlands of Mongolia and Sinkiang with branches terminating at points on the Siberian-Mongolian frontier, is the only move that China can possibly make to checkmate Russian economic and political penetration into these regions. This port of Hulutao is being constructed at a cost of $6,400,000 gold or say $20,000,000 silver at the present average exchange, or one half the estimated first cost of Dr. Sun Yat-sen's Great Northern Port. If the money is to be spent on Hulutao, the Great Northern Port scheme must be definitely shelved and the outlet to Dr. Sun's eminently practical railway system shifted to the more northern port. In so far as Hulutao is a divergence from a general scheme of supreme national importance for a purely local one coming under the jurisdiction of the Mukden authorities, it is open to severe criticism. It stands to reason that a semi-independent state like Manchuria, is not particularly interested in any program that is not purely regional in character. Hulutao, viewed from this angle, is a hindrance to the future unification of the country under a strong central government, and a barrier to the carrying into execution of any comprehensive program for the proper defense of the nation. If Hulutao is to become the Great Northern Port of China, with the strategic railways for the defense of the nation radiating from that terminus, then it is clear that unless the recognized government has full control and jurisdiction over this port and its hinterland, the burden of defending China against the menace from the direction of Urga must be borne by the Manchurian



(From "Port of Hulutao")

Map Showing Location of Hulutao and the Great Northern Port of Dr. Sun Yat-sen's Development Scheme

War-Lords. The entire cost of the Manchurian and Mongolian system of defense railways should not exceed $200,000,000 gold, a mere bagatelle compared to the total of three and a half billions squeezed out of the Manchurian farmers to pay for the campaigns of their ambitious War-Lords.

A further note of compelling interest in the following report, is the scheme for the development of the Great Eastern Port in Hangchow Bay with its proposed canal connecting Hangchow with Wuhu on the Yangtze River. The cost of this work is approximately the same as that of the Great Northern Port, or $44,000,000 silver. The completion of this project, will necessarily have a marked effect upon the position of Shanghai as the outlet for the trade of the Yangtze Valley, diverting practically all the up-river junk traffic through the Wuhu canal to the deep water outlet on Hangchow Bay.

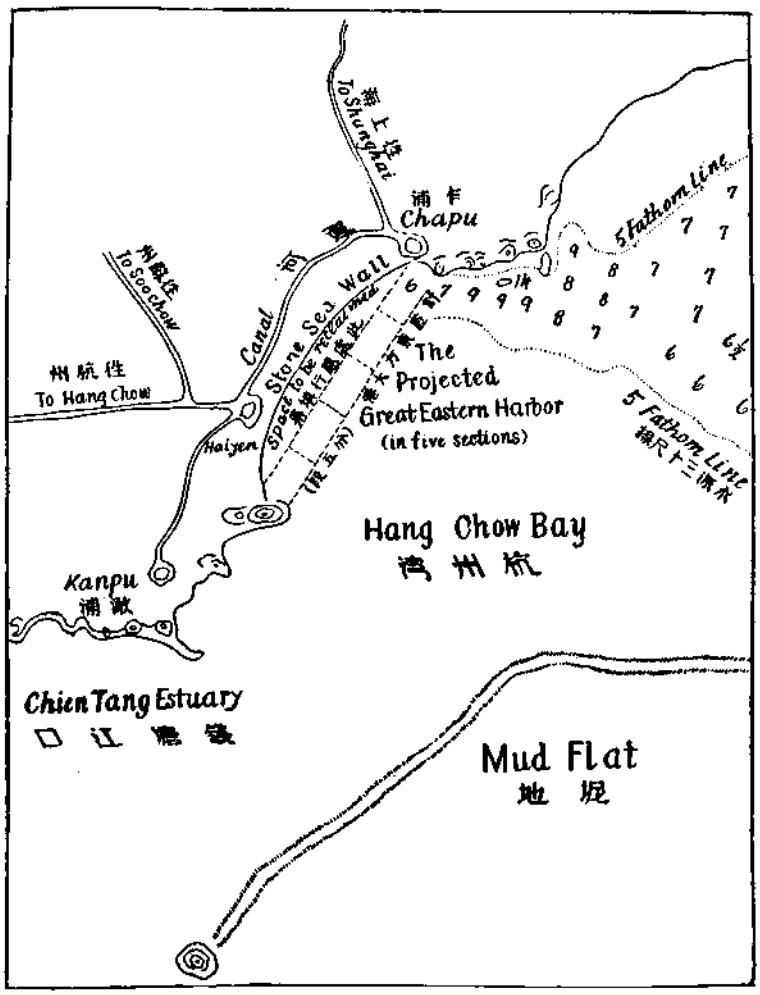
As to financing these schemes, it is of interest to the engineers of other nations to learn that the main source of capital to carry forward the work, is to be derived from the remission of the Netherlands Boxer Indemnity, If this plan is carried out, it means that a practical monopoly of building China's great harbors will go to Dutch concerns, who, it must be admitted, are experts in this branch of engineering. At any rate, if the Dutch Boxer Indemnity Funds are to finance the port works, Dutch engineers are justly entitled to preference over others in carrying out the contracts, a guarantee to China and the rest of the world that the work will be well done.]

Abridged Report of the Conservancy Department of the National Construction Commission during 1928-1929

Floods are one of the main causes of China's famines. The Hwai River, flooding large areas of land in Anhwei and Kiangsu every six or seven years, causes a yearly loss of food equivalent to 25,000,000 piculs of rice. Hopei province is another place where floods are frequent. The narrow Hai Ho is inadequate for the discharge of large volumes of water in that province. The value of the yearly loss of rice is probably $20,000,000. The Yellow River, which does so much damage now as previously, is yet another potential enemy of the country. In 1925, it broke through a dike in Shantung, flooded 800 square miles of land and damaged $20,000,000 worth of farm products. Besides these important floods, there are many minor ones in nearly all parts of the country in rainy seasons. It is estimated that the total yearly loss due to floods in China is at least $200,000,000.

With these facts in view, the National Government entrusted to the National Construction Commission to deal with the situation and prevent further disasters caused by uncontrolled rivers. As a result of long preparation, the Conservancy Department of the National Construction Commission was organized in November 17, 1928, with the following specific functions:

(1) All works relating to improvement of rivers and lakes.
(2) Planning, designing, execution and administration of conservancy works.
(3) Construction and administration of irrigation works.
(4) Reclamation of river and lake accretions.



The Great Eastern Port Near Hangchow of Dr. Sun Yat-sen's Reconstruction Scheme

(5) Development of water power.
(6) Construction of proposed harbors as enumerated in Dr. Sun's schemes for the Industrialization of China.
(7) Supervision of provincial conservancy bureaus.
(8) Other matters relating to conservancy works.

Work of this Department since 1928 to the end of 1929 are reported in the following:

A.—Harbor Construction Works

1. *Hulutao*—Hulutao, a promontory projecting into the Gulf of Liaotung, is located in N. 40° 44′ and 121° 1′ east of Greenwich, some 110 miles north of Chingwangtao and 184 miles south of (Mukden) Shengyang. It is about five miles long, having many hills, the highest of which does not exceed 400 feet. It is regarded by experts as the only location suitable for the purpose of constructing an ocean harbor north of Chingwangtao. It is free from ice in the winter and joins the Peining Railway at Lienshan, thereby capable of drawing traffic from almost all parts of Manchuria and East Mongolia. Sheltered inside the Gulf, it is not subject to typhoons and the preliminary works constructed some twenty years ago can now be utilized in the present scheme.

The contract for the work was signed in Tientsin on January 24, 1930, between the Peining Railway Administration, represented by General Kao Chi-yi, managing director, under the instruction of the Ministry of Railways and the Supervision of the North-eastern Commission of Communications, and the Netherlands Harbor Works Company of Amsterdam, Holland, represented by Robert de Vos. Two and a half or three years from now, a part of the harbor will be available for commercial operations.

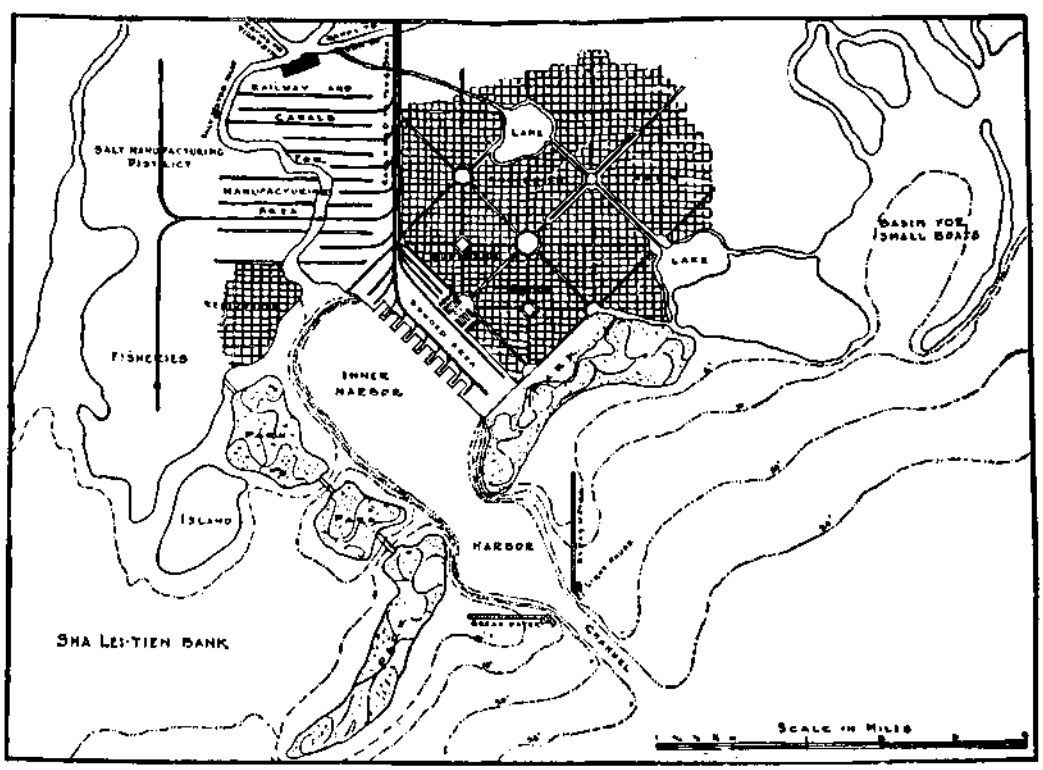
When completed, there will be a berthing line of 8,800 feet, sufficient to accommodate 16 steamers of 400 feet each and other smaller crafts. The harbor can be expanded to accommodate 100 steamers. With Newchwang excepted, Hulutao is the nearest seaport of Liaoning, Kirin, Heilungkiang and Jehol. It has the advantage over Newchwang because it is ice-free and capable of berthing deep draft sea vessels. It is proposed to make Hulutao a free port. If this is adopted there would be a zone of a few miles within which no Customs Duties are to be levied. This will encourage the growth of industry and trade in this district and prove a strong competitor to Dairen, the Japanese leased port of Manchuria.

The contract contains 16 articles. The work was started on April 15, 1930, and is to be completed October 15, 1935. For the various works, a sum of U. S. G.$6,400,000 is to be paid in monthly instalments of G.$95,000 each, a price appraised by experts as reasonable. The specifications consists of seven items; (1) Breakwater. Two breakwaters will be built, one at the southern part and one at the south-western part. The southern one has a length of 4,100 feet and the south-western one 1,900 feet. (2) Quay-walls consisting of three sections of 800 feet, 1,200 feet, and 1,700 feet respectively will be erected. (3) Construction pier; The construction pier of a rubble mound, is to be 900 feet long. (4) Retaining dikes. (5) Dredging of harbor basin and an entrance channel. (6) Reclamation of low grounds and part of the foreshore. (7) Excavation of Bon Lan Shan and Kao Liang Tou To.

2. *The Great Eastern Port.*—The Great Eastern Port is on the north shore of Hangchow Bay. The harbor has a depth of from 24 to 30 feet at low water. The proposed port when constructed can be easily connected with the Shanghai-Hangchow-Ningpo Railway, of which the nearest station is only 30 miles away. Chien Tang River runs directly from the inland cities to the port. These will enable this port to be connected with all the fertile regions of Chekiang as well as its industrial centers.

In a lengthy memorandum submitted to the National Government, the Reconstruction Commission pointed out the necessity of such a port, notwithstanding that Shanghai is nearer the mouth of the Yangtze and not far away from Hangchow Bay. The trouble with Shanghai is that the Yangtze river carries a tremendous volume of silt which yearly deposits an area 40 sq. miles 10 feet deep, while the Chien Tang River carries very little silt. Another

(Continued on page 507).



The Great Northern Port of Dr. Sun Yat-sen's Scheme, Located at the Mouth of the Taching River, Between Taku and Chingwangtao

Conservancy Works in China

(*Continued from page 497*).

handicap of Shanghai is that the Yangtze Channel is only 40 miles, while that of Hangchow Bay 60 miles, and steamers can not enter the Whangpoo in the winter when water is low, which is usually 17 feet. To facilitate water transportation between the proposed Hangchow port and various points in the interior, it is proposed to dig a canal connecting the proposed port with Wuhu, in Anhwei province and Yi-hsin in Kiangsu Province.

The construction work will be divided into three periods. The first period will be devoted to surveying and preliminary preparations. The expenses for this period will total about $1,200,000. Actual construction will be done in the latter two periods. About $20,700,000 will be spent in the second period. This sum includes $5,000,000 for the construction of a breakwater, $2,000,000 for warehouses and docks, $2,000,000 for the building of a railway connecting the proposed Great Eastern Harbor with Chia-shih on the Shanghai-Hangchow-Ningpo Railway, $4,000,000 for the construction of a canal running from the proposed port to Wuhu, $500,000 for a power plant and about $250,000 for water works. Approximately $44,150,000 will be needed to complete the program outlined for the final period.

3. *The Great Northern Port.*—The Great Northern Port is on Phai Bay, between Taku and Chingwangtao, where the Taching River flows into the sea. Although Tientsin is at present the principal port in the north, owing to the shallowness of the Pei Ho, most of the coastal steamers have to anchor off Tangku near the mouth of the river about 50 miles from Tientsin, and handle cargo to and from lighters. According to the investigation of experts, the channel can be easily dredged to a depth of 30 feet. The port is frozen in the winter for two months, however according to the experts that with the construction of breakwater and with the aid of ice-breakers, the port can be kept ice-free at all times of the year.

The Reconstruction Commission has worked out the necessary amount of capital for such an undertaking. It is reported that $57,700,000 be used for the construction of this Great Northern Port. The construction will be divided into three periods of five years each, and it will take $3,900,000 every year for fifteen years to complete the project; $22,000,000 in the first period, $18,200,000 for the second period, and $17,500,000 for the third period. It is also estimated that as soon as the first period is completed the port will be able to derive revenues sufficient to pay the expenses in the second and third periods. It needs only $22,000,000 to start the work of the first period and then the entire program can be carried out from revenues.

As to the source of the funds for the Great Northern Port and the Great Eastern Port, the National Government has decided to appropriate the entire amount of the refund of the Netherlands Boxer-Indemnity Funds. It is evident that the Netherlands Boxer-Indemnity Funds is not sufficient for such two gigantic projects. It is proposed that (1) the National Government be urged to set aside a certain amount of money every year for this purpose, (2) $40,000,000 worth of government bonds be floated, and (3) negotiations be started with an American banking group for a loan. It is believed that enough funds may be raised from these sources. The Hulutao construction work has been started with funds available on hand. It is hoped that the construction work of the Great Northern Port and the Great Eastern Port will not be unnecessarily delayed for the opening of these ports to foreign and domestic trade will undoubtedly benefit not only those places in their immediate neighborhood, but all parts of China.

B.—Conservancy Works

Conservancy works done in the year can be enumerated as follows:

1. Plans and estimates for the improvement of the Haiho.
2. Grand scheme for the improvement of the Yung Ting Ho.
3. Plans and estimates for the closing of the dyke breaches of the Yung Ting Ho.
4. Plans and estimates for the improvement of the Grand Canal between Peiping and Tientsin.
5. Plans and estimates for the proposed escape channel from Tu Liu to sea for the relief of flood waters of the Yung Ting Ho, Ta Chiang Ho and Tse Ya Ho.
6. Plans and estimates for the improvement of Chien Kan Ho and Chi Yun Ho.
7. Plans for the improvement of Woosung Kiang.
8. Plans for the improvement of Hsu Kiang.
9. Plans for the improvement of the Grand Canal between Chekiang and Changchow.

C.—Collection and Compilation of Conservancy Data

1. Files and maps from defunct conservancy institutions:
   (*a*) Those from the conservancy Department of the defunct Ministry of Agriculture and Labor at Peiping.
   (*b*) Those from the defunct National Conservancy Bureau at Peiping.
   (*c*) Those from the defunct Huai River Surveying Office at Ching Kiang Pu.
   (*d*) Those from the former Anhwei Conservancy Bureau.
   (*e*) Military maps for the provinces of Kiangsu, Anhwei, Chekiang, etc.
2. Compilation of data on the Huai River.
3. Rainfall data.
4. Data on irrigation.

It is evident that all these activities are only preliminary to a gigantic reconstruction work along conservancy lines. Whether these works can be carried out or not, no one is in a position to predict in view of the continuous civil war in this country. However, all these show at least one point, that is, Chinese nation as a whole are at present keenly interested in the control of nature by scientific engineering works. This is certainly one of the necessary steps for the uplifting of China from chaos.

Coal Mines at Heigan, Heilungkiang

The Heigan coal mines are situated on the left bank of the Sungari river, in Heilungkiang province, about 400 kilometres from Harbin, and 68 kilometres from Liangchiangkou. Their area covers six square kilometres, and rich deposits of coal are found at six places, estimated at over 150 million tons, of which about 600,000 tons represent industrial coal.

The coal obtained from these mines is of high quality, the upper stratum giving the best coal free from foreign matters. When burned it gives little smoke and ashes, and the coke it produces is also of good quality. The middle stratum gives more smoke when burned and its coke is of inferior quality. The lowest stratum emits much smoke and yields almost no coke.

The mines in the district all belong to a Chinese joint stock company called Heigan Mei Kwang Kong Sze with a capital of eight million Harbin dollars, of which five million dollars were spent on the construction of a light railway from the coal mines to the river port Liangchiangkou. The length of the railway is 69 kilometres, having stations at Botsiho, Heiganchien, Heiliho, Chungtehtung, and Hsinshan-chien. There are four railway tracks in the coal mines for inter-transportation. The rolling stock of the light railway includes seven locomotives and a number of gondola cars, each having a capacity for 16.5 tons. Besides freight wagons there are also one second class passenger coach and two third class coaches.

The output of coal of the mines is increasing year by year. In 1926 the output amounted to 2,000 tons and in 1927 it increased to 50,000 tons. In 1928 a further increase of 20,000 tons was recorded over that of the preceding year, the figure for 1929 being not yet available. Of the total output of 50,000 tons of coal 20,000 tons were exported to Harbin, the remainder being sold to steamship companies along the Sungari River.

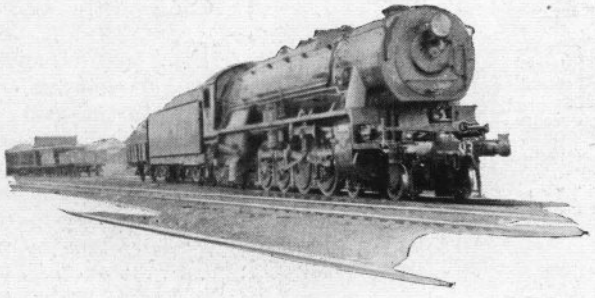
The mines are worked by the open cut system, the soil stratum above the coal being from three to six sazhens or 20 to 40 feet deep. There are about 1,000 workmen employed in the mines. The mined coal is removed to the waiting gondola wagons in big baskets. The long distance between the coal mines at Heigan and the marketing centers like Harbin constitutes the chief deterrent to the development of the mines. The transport facilities between Heigan and Harbin are available only during the warm season when the Sungari river is ice-free. In order to better develop the mining enterprise, the Chinese corporation is seriously considering the building of a railway from Heigan direct to Harbin.

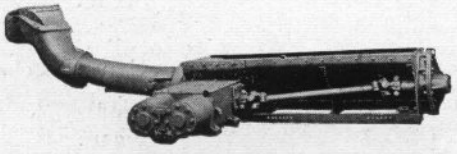
room, one of which serves as a reserve unit; each transformer group comprises a direct-current motor, a 40-k.w. three-phase generator for 110 volts, and a 1-k.w. generator for direct current at 20 volts; the 20-volt generator supplies current for the electric bell system all over the ship. In addition to the connections for the dynamos, there are separate panels on the switchboard for the blowers, the motors for the cooling-water pumps, the lubricating oil pumps, the auxiliary deck machinery and the refrigerating plant, as well as the lighting system, heating system and the motors for ventilating purposes. Of the electrically-driven auxiliary machines, the pumps for the cooling-water will first be described. Two Sulzer centrifugal pumps, one of which serves as a reserve unit, with two stages for 1.5 atm. and 4.5 atm. respectively, supply sea water from their first stage to the fresh-water coolers, whilst the second stage delivers the sea water for cooling the pistons of the main engines. A special pump, which also serves as a bilge pump, pumps the cooling-water from the pistons overboard. Two fresh-water pumps, one of which is a reserve, circulate the fresh water for cooling; they draw from the three fresh-water coolers arranged one behind the other and deliver water to the cylinder jackets and heads of the main engines. The engine room also contains ballast pumps for 250 tons per hour, pumps for deck washing and bilge purposes for 150 tons per hour; pumps for bath water, which deliver water to high-level tanks for the baths; hot-water pumps for circulating the water in the hot-water system, as well as pumps for discharging the waste water from the lavatory pumps overboard.

In addition to the cooling-water system, the lubricating oil system forms an important unit in the Diesel engine plant. There are two sets of lubricating oil pumps provided between the main engines, each consisting of two rotary pumps—a small one for crosshead lubrication, and a larger one for general lubrication—each being driven by an electric motor of 70 h.p. running at 900 revolutions per minute. The pumps draw oil from the sumps of the main engines and from the lubricating oil tank in the double bottom of the ship. The smaller pumps force the oil through filters and supply the various lubricating points of the driving gear direct, whilst the larger ones deliver through filters to a high-level tank, from which the oil flows to all the points connected up to the main lubricating system. The bearings of the blowers are connected to the general lubricating system, as well as the filling tanks of the two centrifugals employed for cleaning the lubricating oil from the main engines. The auxiliary engines drive their own lubricating oil pumps direct, the pumps circulating the lubricating oil in a closed circuit from the sumps to the lubrication points, these points being also connected, as a reserve, to a special piping system with an auxiliary pump, this pump in turn supplying the storage tanks and the tank over the two centrifugals for cleaning the lubricating oil from the auxiliary engines. When undergoing the cleaning process, the lubricating oil from the main engines is heated before passing into the centrifugals; two of the four lubricating oil centrifugals serve as reserve units.

The refrigerating plant on the *Johan van Oldenbarnevelt* comprises two two-stage Sulzer ammonia compressors installed in a room on the port side, they work on the dry system and have a rated capacity of 240,000 B. Th. U. per hour each at an evaporation temperature of 15°C and a cooling-water temperature of +32°C. There is no intermediate cooling between the stages by means of injection of ammonia, although receiver cooling is provided for use in case working conditions are unfavorable. The compressors, one of which serves as a stand-by, are each direct-coupled to a 50-h.p. electric motor, the speed of which can be regulated to any figure between 320 and 160 revs. per min. in order to vary the refrigerating capacity as required. The two-stage arrangement, the disc valves, the use of metallic packing, the totally-enclosed method of construction and the forced lubrication used on Sulzer compressors, are all features which help to render such high speeds possible. The plant is consequently low in weight and takes up only a small amount of space—desiderata which are of great importance when dealing with marine installations.

In the same room as the compressors, there are also the condensers and the accumulator bottle for taking up surplus ammonia, as well as the distributing station and the brine cooler with the brine pumps. One of the two condensers serves as a stand-by.





Type "B—K" Stoker

Type "B" Stoker

Hand Firing of Low Grade Fuel is Difficult

ECONOMICAL firing of lower grades of fuel necessitates a thin fire and sprinkling the coal over the fire just as fast as burned.

To do this by hand would mean keeping the fire door open almost continuously thereby admitting too much steam killing cold air and even then would be next to impossible for the fireman to maintain maximum steam pressure.

Application of a mechanical stoker permits successful use of any grade of fuel.

In addition it will insure full locomotive capacity.

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ASIATIC MARINE REVIEW

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is a foregone conclusion that the Soviet will oppose the construction of any railway in Mongolia that opens this territory to Chinese colonization and control. In this, she merely adheres to the traditional Czarist "Monroe Doctrine" to maintain Mongolia as a buffer state against the expansion of the Yellow Race, a doctrine that the old régime was prepared to defend by force of arms. The Soviet will not depart from this basic doctrine of national security, unless the game plays into its hands.

We would be the last to question the motives of the German syndicate interested in this development or would we knowingly engage in criticism calculated to deprive their manufacturers of much needed markets, but we are frank to say that if the reported railway contract with Mukden is carried out, and Moscow makes no protest, or takes no steps to enforce it, it will be accepted as clear evidence of the existence of some secret understanding between Berlin and Moscow to which China has unwittingly or otherwise acquiesced. If unfortunately, this is to be the line-up in Asia, if this is China's answer to Japan and the Western Powers, the threat to Japan will sooner or later compel a new alignment of the Powers to defend themselves against the Sovietization of Asia, or, a clear cut understanding that Japan can take her own measures for defending her vital interests, backed by the full financial power of Great Britain, America and France.

The time has arrived when the Consortium Powers should seriously consider a revision of their negative policy towards China, getting back to the original idea that influenced President Wilson to reverse himself and invite its formation. If it was considered judicious and statesmanlike in 1917 to finance China with the sinews of war to pit her against the Central Powers, then it is still more prudent and sensible in 1930 to formulate some program that will enable the Consortium to place China in a position to defend herself against the menace from the direction of Urga. The promise of this financial support would exert a powerful influence in establishing a strong central government in China and unite all factions to confront the danger from without. Political unification and centralized control of finances and railways must precede any outside financial assistance and although such assistance might firmly solidify and perpetuate the rule of the group in power at the moment, even this is preferable to national defeat and dismemberment. If China cannot unite and place herself in a position where outside help can be freely extended to her; if selfish considerations and desire to handle the funds on the part of grasping war-lords continue to impede unification and concerted national action, then China is unworthy of any sympathy or help from the outside and the Powers interested in preserving her sovereignty and territorial integrity will either have to actively intervene or stand aside while the Soviet gains the ascendency and makes good on its threat to utilize China as a spring-board for World Revolution. Unless something is done to bolster up China from without, within ten years the Communists will rule the country. Get together, China!

G.B.R.

The British Boxer Indemnity

THE final disposition of the remitted British portion of the Boxer Indemnity fully justifies the vigorous stand taken by this magazine in 1924 for the employment of these funds for railway construction. When Parliament passed legislation for the remission of the British share of the indemnity, this magazine in the face of an almost solid opposition, advocated that the greatest benefits to both countries could be attained only by constructing railways which would provide a much needed outlet for British railway materials, at the same time creating new sources of revenues in China whose surplus could be earmarked for educational purpose. In an editorial in our July 1924 issue, under the title of "*Build China's Railways—A Practical use for the Boxer Indemnity,*" after criticizing the American Government for breaking away from the terms of the Boxer Protocol and its implied international commitments by remitting its share of the indemnity for educational purposes and advocating the employment of the remitted Boxer funds of all countries for railway construction, we concluded with the following paragraph:

> "America expects other Powers to live up to the joint obligations imposed upon them through the Consortium and the Four Power and Nine Power treaties. In these matters, faithful adherence to the principles involved are calculated to preserve American ideas of what is best for themselves and for China. Other powers, are however, more interested in the material development of China than in her cultural and educational progress. America has broken away from her associates in order to advance her special cultural interests at their expense. The time has arrived when there should be a coming together on these matters and if America expects cordial and loyal co-operation, there should be some reciprocity, some sacrifice of our ideals for the benefit of our associates. This article shows a practical way out, one that can be applied with advantage to all. At the rate we are going, the present generation will be dead and forgotten by the time the consortium is ready to function. In the meantime, China rots and decays for lack of transportation facilities, while foreign firms are being forced one by one to the wall through China's inability to meet her obligations. *Education, sanitation, cultural and spiritual uplift will not solve the problem. Loans to China at this time are out of the question. Colleges will not build railways, but railways will build colleges. Let the Boxer Indemnity do the work.*"

The above editorial was followed by an exceptionally strong authoritative article on Chinese railway conditions contributed by one of the best informed British railway experts in China, entitled, "*Why Waste the Boxer Indemnity in Education.*"—"*Build Railways and Provide Employment for the Masses.*" These arguments were reinforced in a further editorial in our October 1924 issue, entitled, "*The Full Rice Bowl; Common sense and Practical Christianity Applied to the Boxer Indemnity.*" In the meantime our views were brought to the attention of the Federation of British Industries, which reversed its original recommendation that the funds be used for educational purposes and urged upon its government that industry be represented on the committee to decide the purpose to which the Boxer Indemnity should be put.

In those days, the British missionary and educational element, emulating the American precedent, were clamoring for the allocation of all the remitted indemnity funds for schools and colleges. Public opinion favored this viewpoint and those who took a more utilitarian view were termed sordid and mercenary materialists. Had our original recommendations been acted upon and the Canton-Hankow Railway pushed to completion in 1924, the British would not have had to undergo the humiliating disaster of the Canton and Hongkong trade boycott and a loss of prestige throughout China that culminated in the Hankow surrender. The whole course of Chinese history might have been changed had a more practical policy prevailed in the disposition of the Boxer funds at that juncture.

Tardily, under severe economic pressure, the pendulum has swung the other way and we welcome the change in policy that will alleviate unemployment in England, assure a full rice-bowl to millions of starving and despairing Chinese and still advance the cause of education. The terms of the new agreement for the disposition of the British Boxer Indemnity is a clear cut endorsement of the policy of this magazine; using the bulk of the funds for rehabilitating and building railways for the creation of an endowment to be subsequently devoted to educational purposes. The details of the agreement are as follows:—

> By an exchange of Notes effected on September 19 and 22 between Dr. C. T. Wang, Minister of Foreign Affairs, and Sir Miles Lampson, British Minister to China, it has been agreed that all payments of the British share of the Boxer Indemnity of 1901 will, subject to the necessary legislation being passed in the British Parliament, be remitted by the Government

of the United Kingdom as from December 1, 1922, to the control of the Chinese Government.

The Chinese Government will apply the bulk of the funds thus remitted to the creation of an endowment to be subsequently devoted to educational purposes by investing the said funds in the rehabilitating and building of railways and other productive enterprises in China. Such investments shall be regarded as loans bearing interest and providing for eventual amortization.

For the control, apportionment and administration of the endowment, the Chinese Government will appoint a Board of Trustees in China, in which will be included a certain number of British members.

The Chinese Government will place in the United Kingdom all orders for materials to be purchased out of the remitted funds or out of the loans secured on such funds. There will be established a Purchasing Commission in London for the purpose of making contracts for the supply and delivery in China of any machinery or materials to be ordered by the Chinese Government, discharging all obligations that may be incurred under such contracts and establishing a reserve fund out of any moneys not for its immediate use so as to meet future requirements of the Chinese Government.

The Commission will consist of a chairman (China's Diplomatic representative in London), a representative of the Chinese Ministry of Railways, and four other members appointed by the Chinese Government, after consultation with the Board of Trustees, from a panel of persons commended to the Trustees by the British Secretary of State for Foreign Affairs as being persons of standing with wide experience of business matters.

All accumulated funds now on deposit– less two sums mentioned hereafter –as well as one-half of all future instalments will be transferred to the Purchasing Commission to be used in the above-mentioned manner.

The other half of each future instalment will be transferred to the account of the Board of Trustees in China.

It is understood that the Purchasing Commission will be exempt from all taxation respecting any income accruing thereto. Certain detailed rules have also been agreed upon regarding the constitution, powers and proceedings of the Commission.

A sum of £265,000 and a further sum of £200,000 will be set aside out of the accumulated funds now on deposit to be donated respectively to the University of Hongkong for the education of Chinese students, and a Universities China Committee in London for the purpose of inviting eminent Chinese to give lectures in the United Kingdom and otherwise promoting cultural relations between China and the United Kingdom.

The British share of the indemnity outstanding in 1922 was approximately £11,000,000. A White Paper for the year ended March 21, 1929, showed an accumulated balance on deposit in London drawing compound interest, of £2,850,000, out of which the £465,000 mentioned in the agreement must be deducted, leaving some £2,300,000 immediately available for construction purposes. The stipulation that all materials are to be purchased in the United Kingdom, together with the creation of Chinese Government Railway Purchasing Agency in London, along the lines forecasted in the December 1929 issue of this magazine, assures to British manufacturers free competition in all tenders for materials and to the Chinese, the benefit of the lowest possible prices.

We have foreseen this new departure in Chinese official purchasing methods and if followed by the establishment of similar agencies in other countries supplying funds for Chinese railway construction and public works, it will have a most disastrous effect upon the business of local engineering firms representing foreign manufacturers. The British precedent while assuring full benefits to British industry is a severe blow to British firms in China. In effect, the funds are British and all British manufacturers are entitled to the full benefit of their expenditure under guarantees which assure to all competitors open tenders and equal opportunity, something which is not possible on the ground here in China, unless every manufacturer is represented. If the operation of such an office in London justifies its existence by reducing the costs of materials to the Chinese Government, the tendency will be to utilize it for the purchase of materials other than those required for the Indemnity Railways, developing into a full-fledged Chinese Government Purchasing Office for the placing of other orders for construction materials.

If the report is true that the contract for financing the proposed Mongolian and Manchurian lines is going to Germany, it is a foregone conclusion that all the materials will be purchased in that country. In these days of worldwide unemployment and distress, there is bound to be a revival of old loan conditions stipulating that the country supplying the funds will have preference in furnishing the materials. If, in order to obtain the lowest prices arising from an open competition for all the manufacturers of the lending nation, a purchasing agency is established in its capital, the middleman in China will have a hard time holding on.

The funds immediately available from the British Boxer Indemnity should build 275 miles of new railways and the annual instalments of about £480,000 for the next fifteen years, another 50 miles a year, or a total of 750 miles, a grand total of some 1,000 miles of new railways whose construction can be undertaken at once, by issuing a loan secured on these funds. According to Minister Sun Fo, the greater part of the returned indemnity will be used to complete the 170 miles of the Canton-Hankow Railway while the rest will be appropriated to rehabilitate and improve all the Government-owned railways in the country, which if carried out, will re-establish a monopoly for British manufacturers to supply materials to the railways created in this country with British capital. This will again confine the demand for American railway supplies to those lines built by purely Chinese capital.

This constitutes a decided victory for British interests in China, one which will do more to bring peace and stability to the country by providing work for the starving masses than any other measure. Had the American Government followed our suggestion in 1924 to utilize the outstanding balance of the American portion of the Boxer Indemnity, to complete the line into Szechuen employing the profits of the line as an endowment for schools, instead of sinking the whole sum into further educational activities, American manufacturers would by now have developed a wonderful market for their products in Western China and, by eliminating traffic through the gorges and upper reaches of the Yangtze River, we would have saved the investment on a fleet of river gunboats and avoided the constant armed clashes with pirates, Reds and independent military satraps who prey upon the river traffic.—G. B. R.

* * *

The attitude of the British commercial community in China towards the terms of the Boxer Indemnity Agreement is very clearly set forth in the following leading article in the current issue of *The British Chamber of Commerce Journal*:—

"The terms of settlement of this vexed question have now been published and merely await the necessary legislation being passed by Parliament for their confirmation.

"These terms, whilst being satisfactory from the point of view of the manufacturer in Great Britain, must be the source of considerable disappointment to British firms in China to whom large sums of money have been owing for years for supplies to the various Chinese railways.

"Not only is no provision made for the payment of these debts but the Purchasing Commission which will have the task of placing orders in Great Britain for the requirements of the various railways in China will naturally purchase direct from manufacturers so that British engineering firms in China, to whom large sums are owed, will have no opportunity in participating in this business. In view of the fact that it is the British firms in China who have been for many years past carrying the burden, and not the manufacturer in Great Britain, it might have been expected that under the terms of the Agreement for the disposal of the Boxer Indemnity, the Purchasing Commission would have been set up in China and a stipulation made that all purchases would be subject to public tender in China.

"The decline of British trade in China is largely due to two causes, namely; the high cost of British material and the fact that the strength of the British merchant in China is being gradually exhausted. It is he who has been the distributor in China for British manufactures. The British manufacturer has received his money on delivery of the goods in Great Britain, whereas the British merchant in China, who has been encouraged to build up

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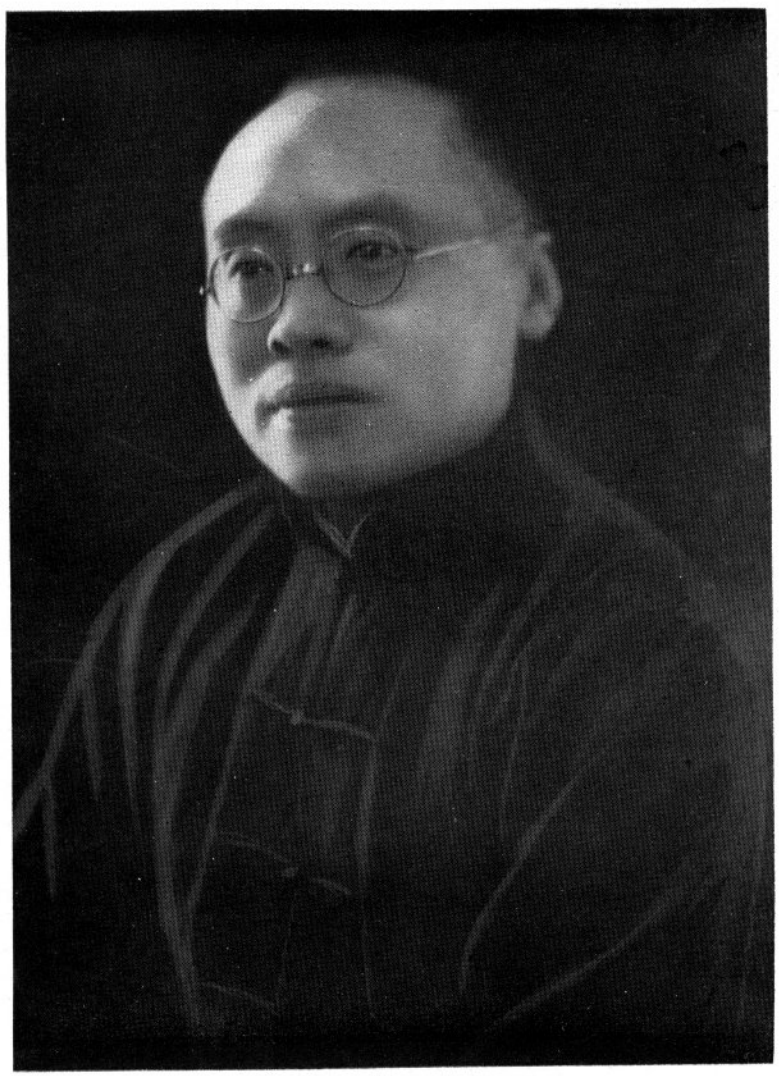
China. As the Manchu Government was then very hard up for funds, it took until the autumn of the following year, before the first instalment of 200,000 taels was forthcoming from the treasury, whereupon the new institution opened its doors on September 27, 1905. Beginning its career without competitors, the Hu Pu Bank did excellently. Shortly the Government rendered further capital payments, whereupon private subscriptions began to flow in.

On February 1908, the Throne agreed to an increase of the Hu Pu Bank's capital to 10 million taels, to be subscribed in equal portions by the Government and the people. At the same time it was decided to change the bank's name to "Ta Ching Bank." The latter's statutes gave—it the sole right of banknotes issue,—a provision which had never been observed. Taken altogether the Ta Ching Government Bank's business flourished.

A most fundamental change was forcibly brought about by the ravages caused by the 1911 revolution and the subsequent downfall of the Manchu-dynasty. In Peking and Tientsin there was a hurried issue of unsecured banknotes. But this made matters only worse. Runs were started on all the Ta Ching Bank's branches. In Shanghai $2,000,000 were withdrawn within three days by anxious depositors; yet the Shanghai branch managed to withstand the storm. Hankow was less successful and had to close its doors. The bank's branches at Changsha, and also at Urga (Mongolia,—declared their independence and even changed their names. In the end the bank became totally exhausted and was unable to function.

A Tremendous Loss

In spite of the heavy run on its cash reserves the Shanghai branch of the Ta Ching Government Bank succeeded in weathering the storm. It was from Shanghai, and not from the prostrate Head Office at Peking, that the launching of a reorganized banking institution was planned and carried into effect. The news of the birth of the Bank of China was announced from Shanghai on February 5, 1912. It was surmised that the entire losses suffered by the now defunct Ta Ching Bank would not exceed the late Government's capital investment, so that the private shareholder's capital investment of Tls. 5,000,000 was paid back by deposit slips payable in four years with interest at five percent. The new regulations of the Bank of China were promulgated by Presidential decree on April 15, 1913.



Mr. Chang Kia-ngau, Director and General Manager of the Bank of China

The authorized capital of the Bank of China was formerly fixed at 60 million dollars, of which $19,760,000 were paid up, a status which was maintained until the late autumn of 1928. When final reconstruction took place.

Though rising amongst flames from the ruins of the Ta Ching Yin Hang, it was not willed by fate that the Bank of China should have a smooth road in front of itself. The eternal monetary crisis, the insatiable need for funds by the Peking Government, and finally the struggle for the Throne by the late Yuan Shih-kai, led to a Cabinet order (dated May 12, 1916) ordering both the Bank of China. and the Bank of Communications, to suspend payment under a Moratorium. However, the Shanghai branch ignored the governmental decree, thereby evading the Moratorium order. It continued to maintain its specie payments, after nominally transferring the local branch to two trustees. Since then the affairs of the Bank of China have not merely been improving, but flourishing, thanks to excellent management and most devoted services rendered by the bank's staff.

In the middle of October, 1928, the Bank of China was once more re-organized (this time under peaceful conditions) as a semi-government institution. Its capital is now $25,000,000, of which the Government has contributed $5,000,000. The aims of the bank are clearly to function as an international exchange bank and devote itself principally to the development and to the financing of China's trade with foreign countries, on lines similar the Yokohama Specie Bank's system.

More than a year ago the Bank of China opened its own branch office in London, apart from having appointed banking correspondents all over the world. Its last balance sheet was published as of December 31, 1929. The principal items quoted from there are:

Assets:	
Cash on hand ...	$20,849,639
Loans on call ...	313,653,708
Investments in securities ...	33,210,590
Fixed loans ...	96,453,424
Reserves against Notes in circulation	197,728,286
Bank premises ...	6,386,284
Liabilities:	
Capital authorized	$25,000,000
Reserve funds ...	1,026,817
Reserve against bad debts ...	1,251,000
Current deposits...	382,785,585
Fixed deposits ...	55,311,005
Drafts issued ...	5,141,858
Notes in circulation	197,728,286

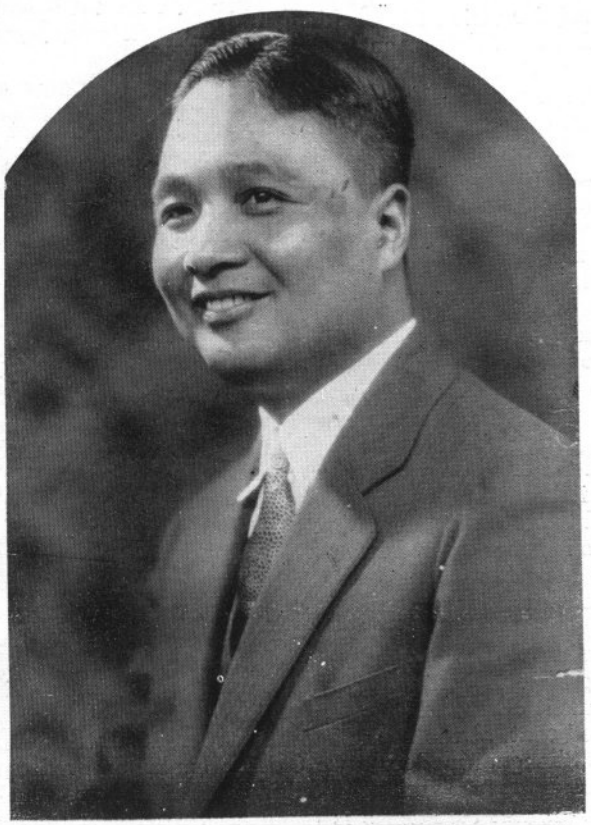
Working under most serious handicaps, the Bank of China succeeded in not merely surviving, but attaining a premier position amongst the modern commercial banks of China. Its excellent standing and repute is in no small degree due to the untiring efforts of its officers, amongst whom the names of Messrs. Chang Kia-ngau and Sun Hang-chang are most outstanding.

The second Government Bank, since converted into a semi-governmental institution, is the Bank of Communications. It received its charter from the Manchu Government on December 8, 1907. Its capital was fixed at 10 million taels, of which two-fifths was to be provided by the authorities, while the remaining three-fifths were to be subscribed by the public. The avowed object of this bank was, as the name applies, to develope and finance means of communications, and especially to be instrumental in looking after the financing of the many newly planned railway lines. The revolution of 1911 caused the bank considerable losses.

Due to the change in the country's régime the Bank of Communications in 1914, secured a new charter by Presidential Mandate.

It can also not be denied that, as there were then two Government banks, where one was sufficient for the country's needs, a silent struggle for the custody of Government funds developed between the Bank of China and the Bank of Communications. Under its second charter the Bank of Communication's authorized capital was $20,000,000, of which $7,713,350 was paid up at the time the second reorganization became necessary.

In November, 1928, the Bank of Communications was reorganized into a semi-Government institution, on lines similar to



(Photo by Sanzetti)

Dr. H. L. Huang, Manager of the Ho Hong Bank, Recently Appointed Vice Minister of Railways. One of China's Promising Financiers

the ones applied to the Bank of China. The Ministry of Finance of the National Government of China sanctioned a new set of regulations pertaining to the Bank of Communications on November 17, 1928. The newly authorized capital was to be $10,000,000, of which $2,000,000 was supplied by the Government, while the remainder was subscribed by the general public. As was the case with the new statutes of the Bank of China these also provided for the Bank of Communications that the Head Office should henceforth be situated in Shanghai.

The new policy outlined for the reorganized Bank of Communications requires the latter to devote its energies to the support of industries and to the furtherance in the development of the country's means of communications. Removed from the evil influences of politics, the Bank of Communications of to-day has a wide and rich field of activities in immediate view, so that there is a most solid base for useful and remunerative work extant. Some of the gentlemen who have piloted the Bank of Communications out of the many danger zones through which it had to pass and who, moreover, are now guiding its destinies, are Messrs. J. P. Lou, Y. M. Chien and T. D. Woo.

The following figures are extracted from the last balance sheet (as of December 31, 1929) of the Bank of Communications :

Assets :

Fixed loans	$44,100,492
Overdrawn current accounts	74,743,450
Bills purchased	2,090,495
Land and buildings	2,506,678
Cash in hand and at banks	41,994,861
Reserve against notes issued	69,221,511
Investments in securities	8,602,075
Documentary bills	1,639,433

Liabilities :

Capital authorized	$10,000,000
Reserves	2,102,723
Reserve for doubtful debts	3,878,297
Fixed Deposits	35,938,503
Current accounts	102,854,202
Banknotes issued	69,221,511
Sundry creditors	20,100,000
Drafts issued	1,795,612

China has now one real and exclusively Government Bank, The Central Bank of China, with Head Offices at Shanghai. The foundation of this most modern institution has been planned and carried into effect by our present Minister of Finance, Mr. T. V. Soong, who has been acting as the bank's first Governor. The Central Bank has a paid up capital of $20,000,000, furnished entirely by the Government. There are no private shareholders, though the influx of private capital, at a later stage, is not excluded.

The Central Bank is to serve purely in the capacity of a Government institution, as bankers bank, holding Customs, Salt and other Government deposits, managing the Central Mint, attending to the country's loan services, placing new loan issues on the market, issuing banknotes, etc. etc.

Due to the almost incessant civil warfare the Central Bank has opened but few branches in the interior of the country. After an existence of two years, the entire note circulation of the bank is still below 20 million dollars, more than fully covered by specie and first class securities.

The full story of the inauguration of the Central Bank of China, as well as a copy of the Charter of the bank and also its regulations, have been published by E. Kann in the (*China Year Book* for 1930.) Therefore I need not repeat here the contents of these important and interesting documents.

The following figures represent a statement of condition of the Central Bank of China, as of August 31, 1930 :

Assets :

Cash	$11,312,567
Due from banks	22,505,638
Reserve against notes issued	17,505,218
Bills discounted	6,182,609
Loans and overdrafts	24,215,330
Bank promises	3,190,955
Sundry debtors	3,082,713
Accounts receivable	6,095,218

Liabilities :

Capital	$20,000,000
Reserve funds	1,192,682
Bank notes issued	17,505,218
Due to banks	4,464,681
Current accounts	41,119,929
Sundry creditors	2,616,062
Accounts payable	2,515,309
Net profit brought forward	1,927,195

Provincial Banks

In a certain sense the Provincial Banks have to be considered modern Chinese banks. A century ago they functioned as Government Money Shops, but shortly after the opening of the recent century they were either reorganized or created on more or less modern lines. Seeing that the capital is almost invariably provided by the respective province, without participation of private funds, it is not deemed necessary to publish balance sheet for the information of the general public, or to acquaint the world with the doings of these institutions. Although we know a good deal about the organization and the progress of provincial banks in China, it cannot be said that we have sufficient authentic data at our disposal to give detailed descriptions about the actual state of affairs.

Almost every province has its official bank. And almost every one of these has the right of note issue, a privilege which is made full use of to the detriment of the economic situation of the districts concerned. The story of over issue and wholesale devaluation and repudiation of banknotes issued is a long and sad one. The organization of the different provincial banks is by no means uniform ; there is hardly any inter-dependence or co-operation between the various provinces in this respect.

(5) The foundation of modern Chinese banks had its root in the desire and the necessity that Chinese capital and Chinese brains ought to participate in the financing of the country's foreign trade. The first modern bank to open its doors was the Imperial Bank of China (now known as "Commercial Bank of China"), founded by the late Sheng Kung-pao, the promoter of the China Merchants' Steam Navigation Co. and the Han Yang Iron Works. The Tientsin branch was plundered during the Boxer Rebellion, and not reopened again, leaving the Shanghai office as sole branch.

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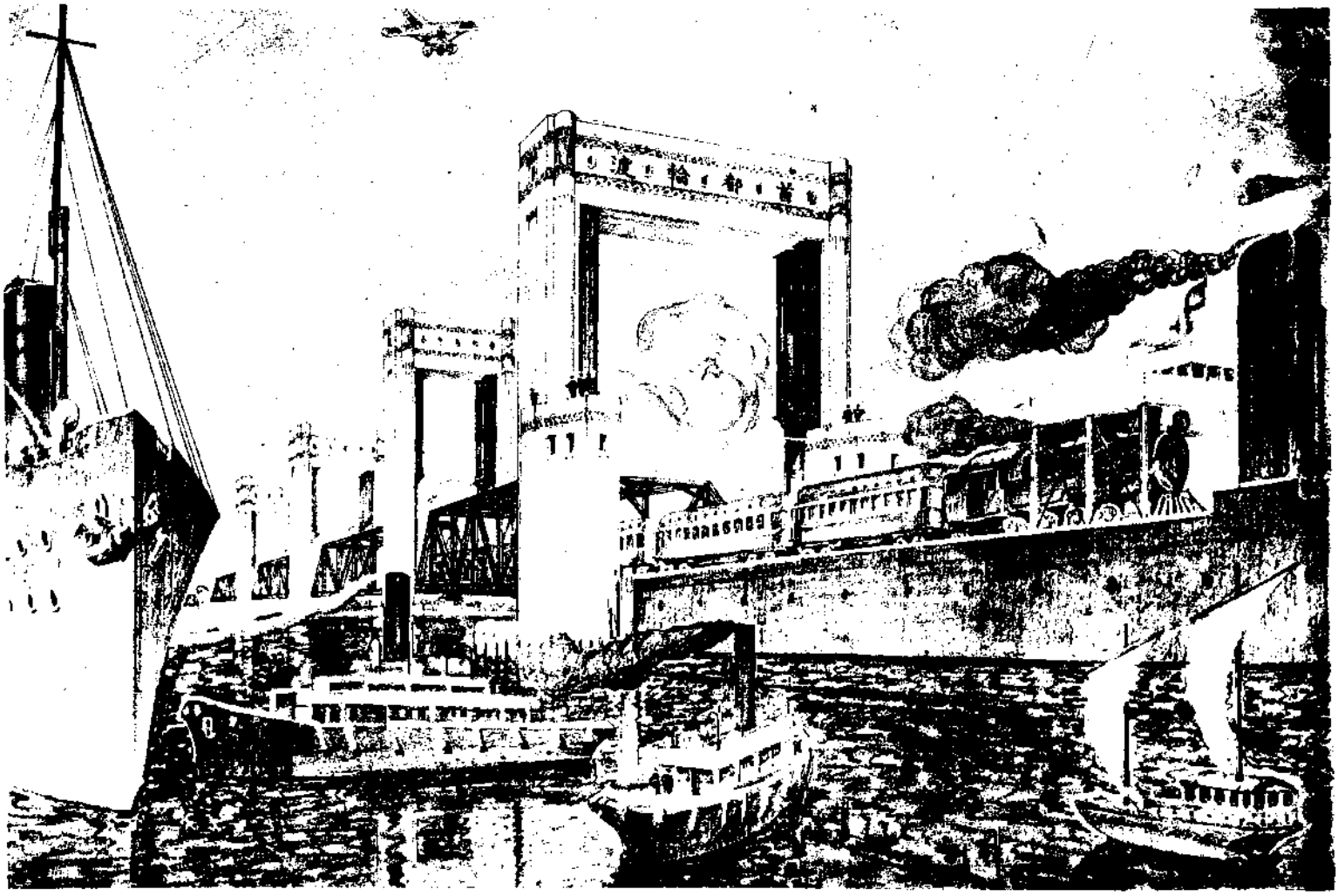


General View of Proposed Nanking-Pukow Train Ferry

Nanking-Pukow Train Ferry

THE Ministry of Railways of the National Government of the Republic of China has decided to construct a Railway Train Ferry across the Yangtze River connecting Nanking with Pukow thus linking together the Tientsin-Pukow and Shanghai-Nanking lines and affording through passenger and freight service between North and South, doing away with the high expense and delays that has hitherto been a burden to travellers and shippers. The project is estimated to cost about $4,000,000. The Ministry has devised general plans and rough specifications as a guide for tenderers and invites quotations and terms for financing the contract to be submitted at Nanking before noon of February 14, 1931.

This will be the first railway train ferry to be operated in China, and is perhaps applicable only to the lower reaches of the Yangtze, where there is an extreme variation of water level of 24 feet throughout the year and a daily tide variation of one to three feet. In the Mid-reaches of the Yangtze, where the variation is as high as 50 feet, the Ministry of Railways, will as soon as its finances permit, build a railway bridge spanning the river between Woochang and Hankow, to provide through traffic between the Canton-Hankow and Peking-Hankow lines.

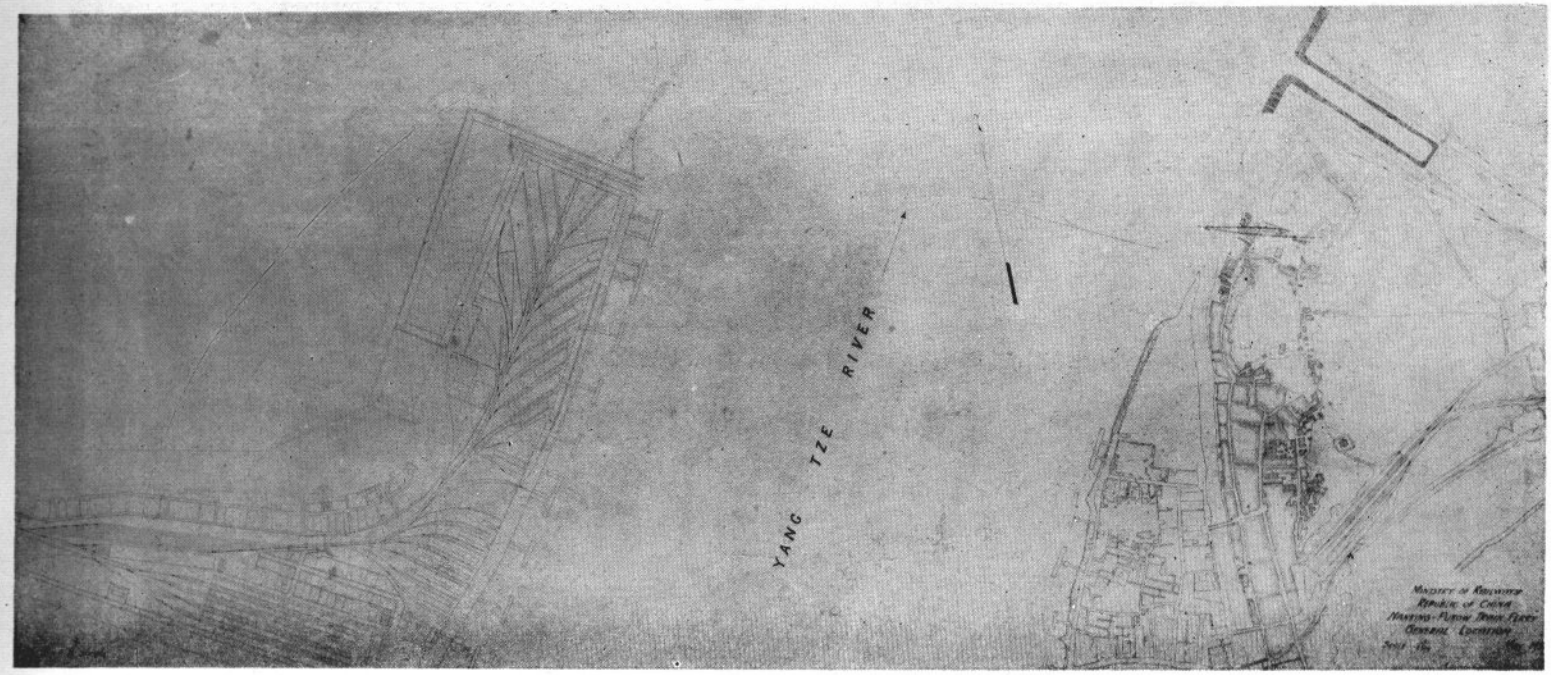
The invitation provides for two distinct types of bids; the first to cover all costs of machinery, equipment and erection and to be paid for by the Ministry. The alternate proposal is for the contractor to undertake the financing and construction under a form of loan agreement to be repaid out of the operating profits of the ferry. The invitations are accompanied by a set of 19 drawings with necessary information or rough specifications. For the benefit of those who might desire to finance the whole contract, there is also a Financial Prospectus showing the volume of traffic over the ferry, with the estimated revenues and operating expenses.

This estimate is an indication of what may be expected in China when internal conditions are stabilized and railway traffic is not hampered by military interference. Over 3,000 tons of freight, will be carried by the ferry daily, and it is noticeable that 1,500 tons represents coal from the Chung Hsing and other Chinese Mines, enabling these enterprises to market their output in Shanghai and compete with other coal landed at the port by steamship. The operating revenues from all sources is estimated as follows:—

Kind of Traffic	*Amount per Day*	*Amount per Year (Counting 300 active days)*
Coal, Chung Hsing Mine ..	1,000 tons @ $1.00 per ton	300,000
Coal, Other Mines	500 ,, @ $1.00 ,,	150,000
Other Goods	1,000 ,, @ $1.50 ,,	450,000
Cotton from Lunghai Rly. ..	500 ,, @ $1.50 ,,	225,000
	(Average for the year)	
Passenger Fares (Through Railway Traffic only) ..	$250	75,000
Total ..	$4,000	$1,200,000

Revenue in future will probably increase at the rate of 10 per cent in every three years.

The approximate annual operating expenses including salaries, wages, coal, sundries. Insurance, repairs and contingencies are estimated at $205,000 leaving an annual surplus of $995,000. A depreciating reserve of 5 per cent, on the estimated first cost of $4,000,000, or $200,000, to be set aside yearly, would leave a net



General Location of Nanking-Pukow Train Ferry

surplus of $795,000 per year. Over a period of seven years, the annual surplus is estimated as follows :—

ESTIMATED ANNUAL SURPLUS IN SILVER DOLLARS

Year	Operating Revenues	Operating Expenses	Gross Surplus	Depreciation Reserve	Net Surplus
1 ..	1,200,000	205,000	995,000	200,000	795,000
2 ..	1,240,000	205,000	1,035,000	200,000	835,000
3 ..	1,280,000	205,000	1,075,000	200,000	875,000
4 ..	1,320,000	205,000	1,115,000	200,000	915,000
5 ..	1,364,000	205,000	1,159,000	200,000	959,000
6 ..	1,408,000	205,000	1,203,000	200,000	1,003,000
7 ..	1,452,000	205,000	1,247,000	200,000	1,047,000
Total ..	9,264,000	1,435,000	7,829,000	1,400,000	6,429,000

As a further aid to those who might desire to tender on financing the work, it is pointed out that $500,000 would be required on signing the contract for preliminary foundation and other work ; another $500,000 would be required at the end of three months after starting work ; $1,000,000 at the end of six months and $2,000,000 at the end of nine nonths. Of this total, it is estimated that $1,000,000 will be spent in China on labor, etc, and $3,000,000 abroad on materials and equipment.

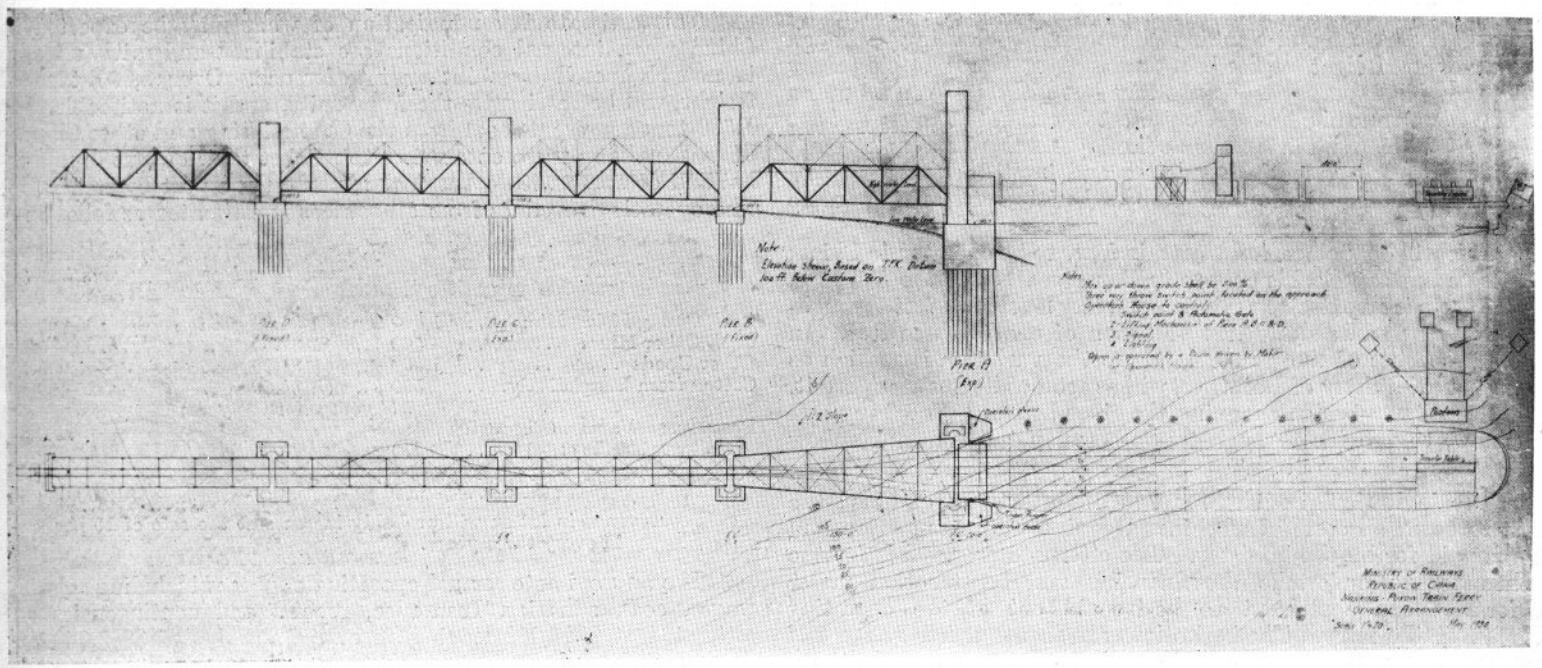
Under the first form of contract, (*a*) tenderers are invited to :—

Prepare designs for the movable steel bridges, steel towers, aprons, ferry boats and pontoons, including the necessary machinery and accessories, with detailed lists, drawings, specifications and explanatory notes, and submit quotations for the costs, c.i.f. Nanking and/or Pukow, Chinese Customs duties and taxes excluded. Time of delivery, terms of payment and other particulars are to be specified in the quotation.

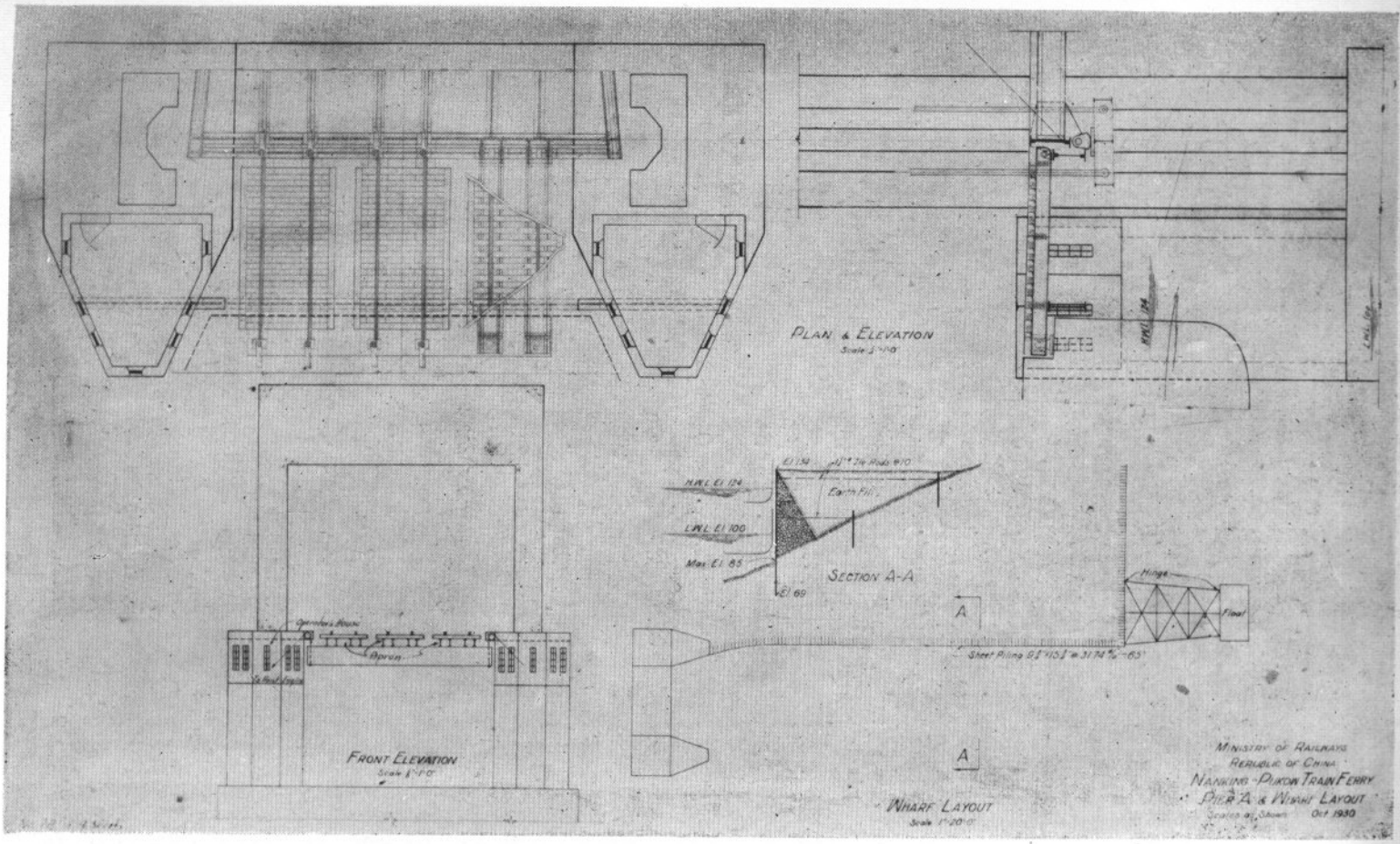
The quotations submitted are to be under three separate headings.

1. Ferry boat complete, including all machinery and other necessary equipment.
2. Bridges, steel towers, aprons, pontoons, machinery and accessories complete.
3. Erection and installation of items under 2. In this case the Ministry will arrange to provide the necessary funds.

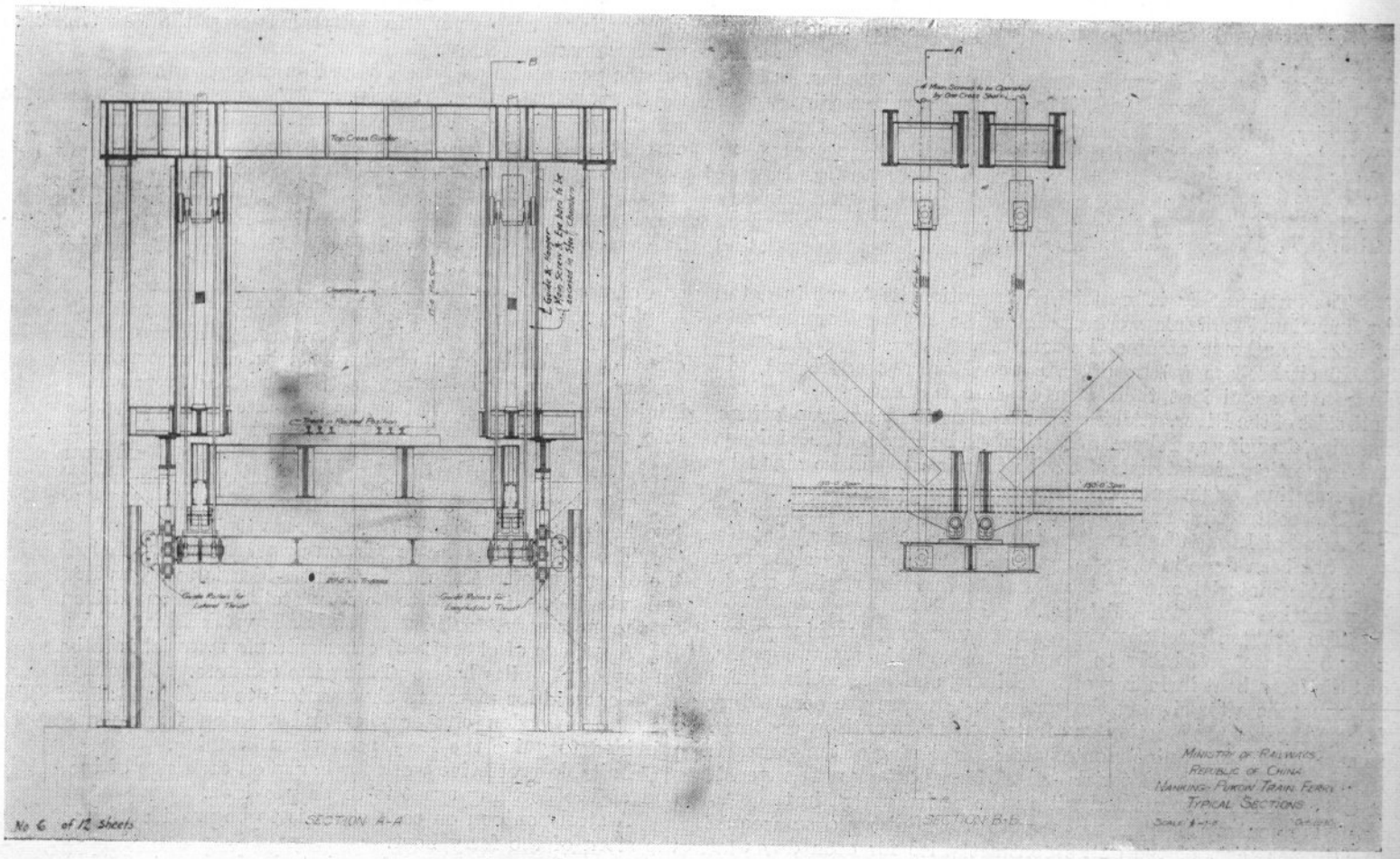
(*b*) Under this arrangement, the contracting firms will do the entire financing for supplying all the articles and materials mentioned under (*a*), as well as for the erection and installation costs, if this work is to be done by the contracting firm. In addition to this, the contracting firms will advance such sum of money, not exceeding the sum of $1,000,000 Shanghai Currency



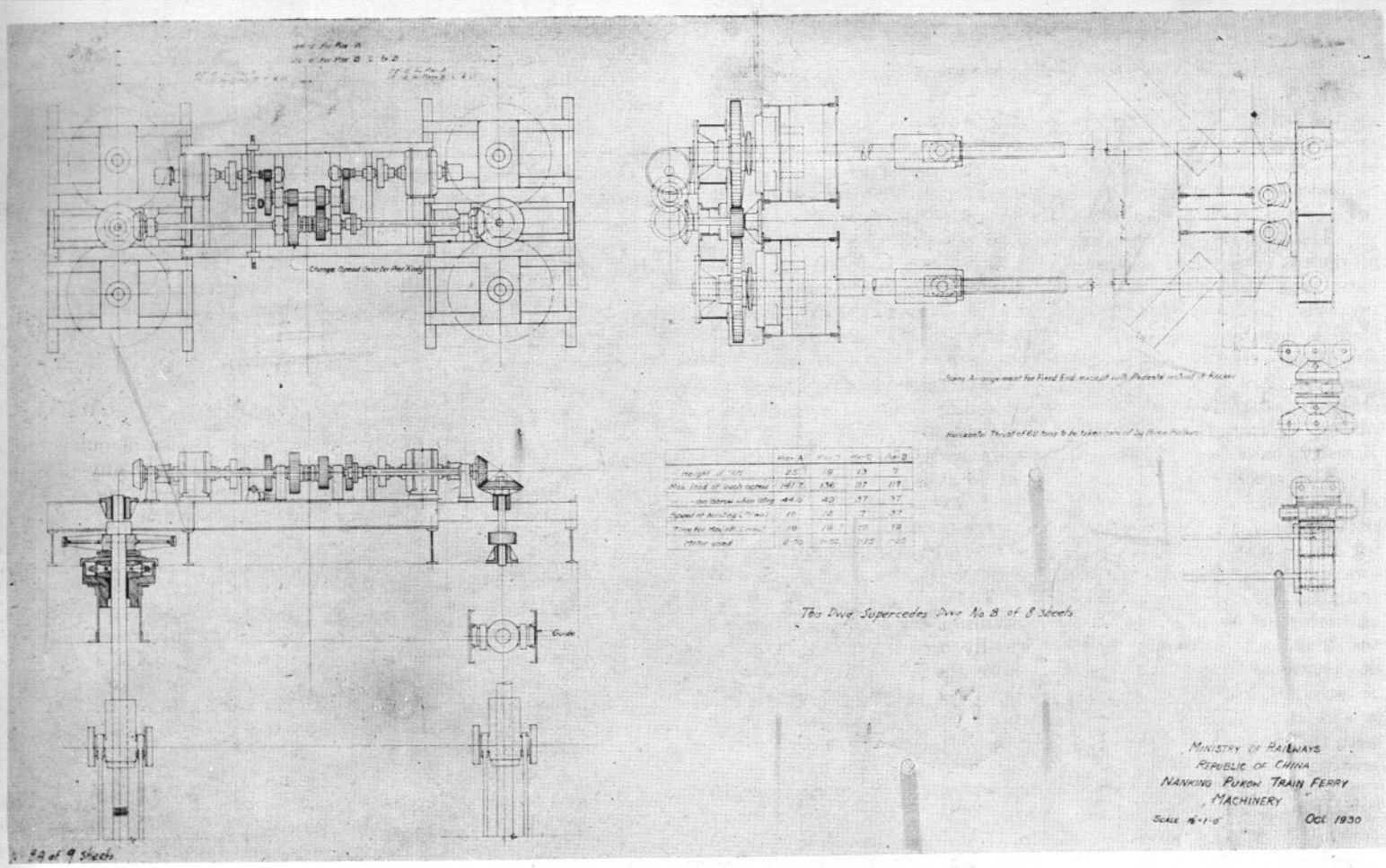
General Arrangement of Nanking-Pukow Train Ferry



Nanking-Pukow Train Ferry: Pier A and Wharf Layout



Nanking-Pukow Train Ferry: Typical Sections



Nanking-Pukow Train Ferry: Machinery

as may be required for executing the foundation and substructure. If the erection and installation is to be done by the Ministry, the cost of such work shall be included in the advance above-mentioned.

Designs for the movable steel bridges, steel towers, aprons, ferry boat and pontoons, including the necessary machinery and accessories, with detailed lists, drawings, specifications and explanatory notes must be prepared and submitted, together with quotations for the costs of these c.i.f. Nanking and/or Pukow, Chinese customs duties and taxes to be excluded. The Ministry would be prepared to furnish as security for all the money advanced a pledge of the entire works, and of the net surplus of the operating revenues.

The quoting firm is requested to mention its terms in detail for financing the whole work, such as the expected annual rate of interest, scheme of amortization, etc.

In either case (*a*) or (*b*), the two Railways concerned will arrange to acquire at their own expense the necessary land on both sides of the River. All the work relating to piling, foundations, masonry, dredging and shore protection will be done by the Ministry.

Inspection of materials used for fabrication will be made by an Inspecting Engineer appointed by the Ministry.

The contracting firm is required to furnish a guarantee for the period of 12 months from the time of the acceptance, that the work has been done in a workmanlike manner and with the best obtainable material and that each and every item will work in co-ordination and with efficiency.

The bridges, steel towers, aprons, pontoons, machinery and accessories are preferably to be delivered within seven months, and the ferry boat including all machinery and accessories within eight months after signing the contract. In case the contracting firm undertakes the erection and installation, the entire work must be completed within nine months after the signing of the contract. In case any or all of the materials and the ferry boat are not delivered, or the work is not completed within the period stated in the contract, the contracting firm will pay to the Ministry a sum equal to 1/10 per cent. of the entire contract price for each day that delivery or completion of the work is delayed, as liquidated damages and not by way of penalty.

The essential features of the contract are as follows :—

The train ferry between Nanking and Pukow is to provide for carrying passenger and freight trains across the Yangtze River which has an extreme variation of water level of 24 feet throughout the year and a daily tide variation of one to three feet during the low water season. Provision, however, must be made for abnormally high or low water and therefore allowance for an extreme variation of 28 feet should be made.

The connection between each shore and the ferry is to be made by four bridges, each of 150 feet span, with adjustable ends which can be raised or lowered to suit the variation of water level. The variation of deck level on the boat when loading and unloading is to be taken care of by a movable apron, 20 feet long, at the outer end of the last span.

The shunting of cars to and from the boat is to be done by a locomotive, or an electric pusher, carried on the boat, or by capstans and cables on the boat, and/or on each shore, or any other system proposed by the contracting firm and approved by the Ministry of Railways. Safety, speed and economy must be taken into consideration.

Foundations and Substructure

The earth slope on both Nanking and Pukow sides is to be two horizontal to one vertical.

The bridge piers are to rest on wooden pile foundations, with the exception of the shore abutment which is to be on reinforced concrete piles. Piles are to be accurately placed and driven down to the necessary depth.

A grillage of old rails or other suitable material is to be made on top of the piles before placing the concrete.

Concrete for piers and abutments is to be of 1: $2\frac{1}{2}$: 5 mixture. Necessary wooden cluster piles and wooden fenders are to be provided to guide the ferry boat when berthing.

Suitable protective work for banks on each side of the bridge and at the berthing space is to be provided.

A steel pontoon on each shore is to be provided for mooring the stern of the ferry boat.

Space for pontoon and ferry is to be dredged to 15 feet below lowest water level.

Steelwork and Machinery

The eight 150 feet spans are to be designed for Cooper's E35 loading with full impact. There will be three tracks gauntleted on the bridge. The three-throw switch points are to be located on shore while frogs are to be on the outermost span, which flares out to allow for three tracks spaced 12 ft. center to center. Rails 85 lb. per yard with necessary fastenings and crossings on the bridges are to be provided by the Contracting firm.

The Chinese Government Railway specifications shall govern all details concerning the bridges, unless otherwise specified. Eye-bars, pins, main screws and nuts shall be made of nickel steel, properly heat-treated and pins shall be case-hardened. Gearing shall be arranged so that the four spans can be raised or lowered simultaneously at a proportionate speed. Provision must be made to allow movement of the outer end of river span independently for slight adjustments when loading and unloading take place. Worm gearing, properly designed and approved by the Ministry, may be used instead of spur gearing.

The machinery is to be designed so that the outermost end of the bridge can be raised or lowered not slower than one foot per minute. The necessary motors, wirings and fixtures for working the movable bridges, as well as the wirings and fixtures for adequately lighting up the bridges and the berthing space shall be provided by the contracting firm. The existing power plants on both sides of the River have a line voltage of 380, with 50 cycles and 3 phase. Automatic and electrically operated gates, to close the entrance to the incline at the shore end of the bridge, are to be provided by the contracting firm. These gates will be always in closed position when the ferry boat is not in secure contact with the apron. The gates are to be interlocked with switch points leading to a catch siding with sand track on the shore.

The three-throw switch points leading to the bridges are to be interlocked with signals and gates. They are to be electrically controlled in the operator's cabin. All the interlocking work mentioned in this Article and Article 12 will be done by the Railways concerned.

Indicators are to be provided in the operator's cabin and on individual towers to indicate the movement of the various spans.

Toggle bars or some other device are to be provided to connect the ferry boat with the apron.

Besides electric operation, proper means are to be provided for hand operation of the bridges and the apron whenever necessary.

Ferry Boat

The boat is to be built to Lloyd's highest classification, and must pass the usual trial test. On the deck there shall be three railway tracks of standard guage, each with a clear length of 300 feet. The center to center distance of adjacent tracks is to be 12 feet. Rails 85 lbs. per yard, with necessary fastenings are to be furnished by the contracting firm.

The freight train to be carried will consist of twenty-one loaded cars of 40 ton capacity, each car having a length between couplers of 42 feet and a tare of 18 tons. The passenger train to be carried will consist of 12 coaches, each 72 feet between couplers.

The boat is to be designed to carry a total live load of 1,200 tons plus the weight of a shunting locomotive if carried on board. Allowance is to be made for overloading to the extent of 50 tons. The boat is to be able to carry three locomotives, one on each track, at the same time, these locomotives to have axle loads of 20 tons each, the axles being spaced five feet apart.

The boat is to be self-propelling and to have a speed of 12 knots in still water. When the boat is fully loaded, the top of rail is to be 12 feet above water level.

The difference of draft of the boat when fully loaded and when with no load shall preferably not be more than two feet.

Life rafts, belts and buoys are to be provided sufficient for 500 persons. Boilers are to be so designed to use bituminous coal for fuel. The boat is to be equipped with necessary machinery, wirings and fixtures for adequate electric lighting with the same voltage, cycle and phase as on the bridges.

Living quarters are to be provided for officers and crew on the boat. In case shunting of cars is done with a locomotive carried on the boat, a transfer table 42 ft. long is to be provided at the stern end to enable the locomotive to operate on the three tracks. The power required to operate the transfer table is to be provided on the boat. The shunting locomotive is not to be provided by the contracting firm. In case the shunting locomotive is not used on the boat, each track shall be 342 feet long. In case an alternate system is used, such should be included in the quotation. Provisions are to be made to securely fasten cars to the tracks on the ferry boat.

Ferry boat is to be designed with a single bottom, and sufficient number of water tight bulkheads are to be provided. Necessary equipment, such as life boats, anchors, chains, portable repairing tools, pumps, etc, etc., are to be supplied and clearly specified in the quotation submitted.

Cause and Effect

(*Continued from page 661*).

Nanking is suspicious of anything that smacks of outside intervention and with good reason. If it now rejects any offer of assistance which carries with it foreign interference in its administrative independence, even temporarily, it is difficult to censure her. Much will depend upon the outcome of Chiang Kai-shek's present campaign to suppress the Communist and Bandit armies that infest whole provinces. If, within the next six months or even a year, these hordes can be disarmed and there continues a real understanding between Nanking and Mukden, China will need no help from the outside. If, on the other hand, Chiang fails and is weakened by his campaign to an extent that Mukden, following the time honored traditions of Chinese warfare, should take advantage of his position to extend its rule and power, then the future is black indeed.

Chiang Kai-shek says that China has fought her last civil war. Chang Hsueh-liang has sworn renewed allegiance to Nanking. Everything is the color of the rose. The outlook is bright and hopeful. Two or three years of peace under an honest government with the revenues of the country flowing into the National Treasury and Nanking will require no assistance from without and all talk and discussion of possible intervention, benevolent, humanitarian or otherwise, is superfluous.

G. B. R.

Political Parties in China

(*Continued from page 665*).

> "The question is on the lips of nearly everybody, how long can the Kuomintang rule can last in China. To be frank, the Kuomintang rule cannot last very long in its present state of affairs. For no public organization built on nepotism can endure for any length of time. Nor could a government 'without the consent of the governed' be very lasting. . . . Under the circumstances, the most sensible thing for the Kuomintang men to do is immediately to call a parliament or a People's Conference as outlined by the late Dr. Sun. Short of this, the present oligarchy in Nanking will eventually collapse like a house of cards."

One conclusion arrived at after reading these two books, is that the day of the foreign propagandist in the employ of Chinese governments is over. The Chinese are now quite competent to fight their own political battles in the press and in the welter of give and take, the real truth about conditions in the country will be exposed by themselves.

The impression is gained that as long as the present régime in Nanking continues to function without recognizing the Left, it will be subjected to an intense propaganda abroad that will counteract its own publicity. In Mr. Liang's acknowledgment of assistance in the preparation of his book, there is a list of names which indicate clearly that the Leftists in China have the powerful support of some of the foremost publicists and moulders of public opinion in Europe, whose influence will be exerted to block any scheme to strengthen Nanking under its present leadership.

It is regrettable that this should be so, for although Nanking is by no means perfect, yet with all it's shortcomings, it represents a distinct advance over the old order of things and it is to be hoped that the split in the Kuomintang can be patched up and a real unification brought about in order to avoid a recurrence of the insensate struggle for power which has brought ruin and misery to millions of peace loving people.

G. B. R.

South Breakwater.—South breakwater was constructed almost in the same way as east breakwater: *i.e.* the classified rubble was first put on the sea bed, outside slope being 1/2 and inside slope 1/1.5, top of rubble mound levelled at 5 m. under L.W.L., concrete caisson settled, its top being 1.8 m. above L.W.L., and the caisson filled with concrete; on the top a parapet wall is to be constructed. Besides, on outside footing of caisson, 13 and 17 tons concrete blocks (1.2×1.8×2.7m. and 1.5×1.8×2.7m.) were piled up and the back was also protected with rubble. The dimensions of the caisson are: length 14m., height 6.6m., bottom width 7m., top width 3.6m.; the inside is divided in four compartments by three transverse partition walls, wall thickness being 18-33 cm., base 26 cm. thick. The caisson bottom is fitted with longitudinal rib wall, 0.55 m. high and 0.36 m. thick. Comparing this with the east breakwater caisson, the top width is the same and the only difference is that the height is 6.6 m. instead of 5.5 m. The foot protecting blocks were increased in number.

Afterwards as the caisson of longer length was considered to be better in view of the advance of works, its length was increased from 12 m. to 14 m. which was the length allowable in the yard. The 95 caissons used for the south breakwater are classified as follows, with regard to their forms:

Kinds of caisson	*Number*
Length 12 m. caisson	66
Length 14 m. caisson	24
Large cais. on breakwater head	2
Special	3
In total	95

Loading.—In order to obtain stable sinking of rubble, the concrete blocks were piled up for loading, and taken away, this being repeated generally three times as in the east breakwater. The sea bed in the position of the south breakwater is covered with a thick layer of mud where rubble sinking should be extraordinary. The three times loading was not sufficient to have stable mound and at last four times loading was repeated several times. Increase of number of loadings expands the expense and time, so we had to find some proper method to diminish the number of loadings. It was expected that if the soft mud on sea bed were dredged as in the case of quay wall, replaced with good sand, and then the rubble deposited over it, the sinking would be reduced very much; so the testing was started on a part of the breakwater.

The test showed following results:

(1) The sinking of mound was very much reduced, and the quantity of rubble saved nearly 25%.

(2) The number of repeating of loading the mound can be reduced, and the labor and time necessary for it can be saved accordingly.

Owing to the above, this method was adopted thereafter, and gave good results.

The total amount of rubble actually needed by the south breakwater construction was 543,500 cub. m. instead of 364,300 cub. m. of calculated volume.

The Cost of Construction of Breakwaters.—The cost of the east breakwater is as follows.

(1) Cost for main part of breakwater per linear meter.

Brenkwater depth in m.	*Length in m.*	*Year started.*	*Year finished.*	*Cost in yen.*	*Cost lin. m.*	*Remarks.*
10	455	1910	1914	563,898		Except the part of parapet wall.
11	636	1910	1918	769,160		
			Total	1,333,058	1,222	

(2) Cost in detail for lower part of breakwater.

(*a*) Part of depth 10 m.:

Name of parts	*Length in m.*	*Cost in yen.*	*Cost per m.*
Rubble mound	455	254,294	559
Loading	455	53,745	118
Surface plaining	455	15,374	34
Total		323,413	711

(*b*) Part of depth 11 m.:

Name of parts	*Length in m.*	*Cost in yen.*	*Cost per m.*
Rubble mound	636	366,866	577
Loading	636	42,635	67
Surface plaining	636	24,318	38
Total		433,819	682

(3) Cost in detail for upper part of breakwater.

	Part of depth 10 m. *No.*	*Cost.*	*Cost for lin. m.*	*Part of depth 11 m.* *No.*	*Cost*	*Cost for lin. m.*
Super Body	455 m.	115,395	254	636 m.	162,291	255
Caisson No.	37.2	—	—	52	—	—
Caisson making	37.2	76,700	168	52	104,903	165
Inside filling	37.2	5,502	12	52	8,536	13
Fill. concrete	3,027 m3	23,100	51	6,137 m3	30,747	48
Fill. blocks	372	8,303	18	581	13,154	20
Tug boat	—	1,788	4	—	4,049	7
Footing Protection	455 m.	125,087	275	636 m.	173,046	272
Blocks	2250	114,352	251	3150	155,770	244
Block piling	2250	9,481	21	3150	13,228	20
Tug boat	—	1,254	3		4,048	9
Total		240,482	529		335,337	527

(4) The south breakwater is now achieved up to 90% of total works, and its construction cost is as follows.

Classification	*Unit*	*Cost in yen*	*Remarks*
Breakwater main part	m.	2,860	2,860 yen per linear meter.
Foundation	,,	1,520	
Rubbling	,,	1,310	
Loading	,,	155	
Rubble surface levelling	,,	55	
Super body	,,	1,135	
Caisson making and placing	,,	375	
Caisson concrete filling	,,	220	
Footing protection	,,	485	
Parapet wall	,,	55	
Miscellaneous	,,	205	
Tug boat	,,	175	
Miscellaneous	,,	30	

Conclusions

We may deduce the following conclusions from the experience of the east and south breakwaters at the Kobe harbor.

(1) On sea bed covered with a thick mud layer, it is possible to decrease considerably the sinking of rubble mound by previously dredging the mud and replacing it with sand, the rubble being deposited on it.

(2) On sea bed covered with a thick mud layer, the breakwater constructed on it should be considered as resting on a kind of floating foundation; it continues to sink down gradually with the lapse of time and if it is attacked by shocks beyond the limited amount, sudden sinking can never be avoided.

(3) The amount of rubble sinking into soft mud in the construction of composite-typed breakwater on a soft foundation such as in the Kobe harbor, will be in the range of 50%—20%.

Diesel Locomotives for S.M.R.

Mr. K. Hanai, one of the engineers of the S.M.R. Japanese State Railways who was sent to Europe in connection with the purchasing of Diesel locomotives on his return recently expressed himself as follows:

In Germany, there are 80 Diesel locos in operation. The disadvantages of the Diesel engine are that they are noisy, give out much soot, and are attended with violent vibration.

If these defects can be eliminated, the Diesel loco will be just the thing for the super-special express in Japan. The obviation of feeding the engines with water will make it very convenient. In Russia, which is noted for water scarcity it is extensively popular. The use of the Diesel engine in Russia and South Manchuria where heavy oil is within easy access will enhance the working efficiency besides saving expenses.

The S. M. R. Co. has a couple of its officials in Germany to order two Diesel locos which are expected in Dairen before the end of the year, where they will be employed for shunting purposes, to begin with.

In Japan proper, there is an ample field for Diesel passenger cars (outside the Diesel locos) because of their exceptional suitability for interurban traffic. Two locos of the same type have been ordered by the Railway Ministry, Tokyo.

When the design and Specifications of the Diesel locos are learned by the Japanese engineers it is expected that they will prove capable of developing a new type that will compare favorably with those of German-make.

In view of the General tendency to employ Diesel locos and passenger coaches, it may be worth while for the S.M.R. Co. to construct a plant for the manufacture of Diesel engines.